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THE TROY WORKS FURNACE RECORD.

The Troy Steel and Iron Company is not to be left behind in the race, and we learn from Superintendent ROBERT W. HUNT the following particulars of a recent good furnace record:

The company has two furnaces, No. 2 and No. 3, in blast. No. 1 is completed, but has not been blown in. Dimensions of furnaces, 18 × 80 feet, with four 20 × 60 feet Whitwell stoves to each furnace. The ore mixture at present averages about 54 per cent iron, and the consumption of coke is 2165 pounds per ton (2240 pounds) of pig. In the first 18 days of this month No. 2 averaged $179\frac{1120}{2240}$ tons per day. December 5th it made $205\frac{900}{2240}$ tons, and on the 8th $207\frac{841}{2240}$ tons. During the same time No. 3 made an average of $165\frac{1493}{2240}$ tons per day, the largest single day's work being $233\frac{620}{2240}$ tons. Mr. HUNT adds: "While these figures are not as large as those of our Western friends, with their rich ore mixtures and Connellsville coke, we feel that we need not offer any excuses. At the same time we are expecting to obtain even better results.

We quite agree with Mr. HUNT. His figures need no excuse. They are splendid and reflect great credit on the management as well as upon Mr. J. P. WITHEROW, who designed and built the furnaces.

SYSTEMS OF MINING IN SOFT ORE BODIES.

The very important question of systems of mining adapted to the exploitation of soft ore bodies, such as the iron ores of the Gogebic and Menominee, is, we are very pleased to note, attracting attention. Mr. LARSSEN'S valuable communication to the Institute of Mining Engineers, which was published in the ENGINEERING AND MINING JOURNAL (November 12th and 26th), gave the experience of the Chapin mine.

Mr. LARSSEN in a letter published on another page takes exception to some of our remarks made in discussing his paper.

It may be somewhat too much to say that "the Chapin mine has tried nearly every known method of work," but it certainly has tried more methods than any other mine in this country, and is for that reason a good example.

We cannot understand Mr. LARSSEN'S contradiction of our statement, "The system of working out the ore in sections from the bottom up, as described by Mr. LARSSEN," for the system is correctly so designated, and in referring to the illustrations and description of Mr. LARSSEN it will be seen that the working out is "from the bottom up" in each section.

Mr. LARSSEN'S reference to the use of this system 140 years ago is interesting, but suggests that it is about time engineers should improve upon it. And even the reference to German miners is not sufficient to demonstrate the presence of "the elements of permanent success" under the conditions which we were discussing. It might have been far more convincing if Mr. LARSSEN could have given us the items of cost in the regular working of this system at the Chapin, so that comparison might be made with the results of working by other systems.

Mr. GOUDIE gives on another page a very interesting description of the system of mining in use in some of the English soft ore deposits, and it presents a "radically different solution of the problem," by working out in sections *from the top down* instead of from the bottom up.

We think some modifications can be introduced in this system which will make it more economical, but it certainly avoids some of the most serious objections made to the system described by Mr. LARSSEN.

SAFE BLASTING IN FIERY COAL MINES.

The dangers from blasting in mines that produce fire-damp and those that are dry and make explosive coal-dust, have of late been so clearly recognized that the use of powder and other explosives has been altogether prohibited in some districts. A great variety of substitutes for explosives have been suggested for use in such mines, and some have been used to a certain extent. Thus, we have had the lime cartridge, wedges, the water cartridge, and many devices to prevent the ignition of the gas or coal-dust by the flame of the explosive. All these methods are more complicated and less convenient in use than common blasting powder, but their safety commends them in certain cases.

It now appears that the new explosive *carbonite* offers all the advantages of a strong powder and at the same time can be used with safety in an explosive atmosphere. The Germans have made many experiments with it and its merits were strongly endorsed at a meeting of mine managers at Dortmund, on the 17th November. It was then stated that it has frequently been fired in an atmosphere containing from 7 to 8 per cent of fire-damp and carrying large quantities of the most inflammable coal-dust that could be procured, and it did not, even in a single instance, cause an explosion. While blasting powder, blasting gelatine, and the various nitro-glycerine powders under the same conditions always exploded the mixture.

It was also pointed out that the carbonite was fired in larger quantities than the other explosives. The charge of 500 grammes (1·1 pound) is the largest likely to be needed in coal getting, this quantity being equal in explosive force to about 3¼ pounds of ordinary blasting powder. At the Neunkirchen experiments, charges of 630 grammes (1·386 lb.) of carbonite was used, equal to 4 pounds 3 ounces of blasting powder.

This information will have a great interest to our own miners, and especially to those working extremely fiery anthracite mines, where an explosive is absolutely necessary to break down the coal economically, and where the amount of fire-damp evolved probably exceeds that of any other mines in the world.

GUSTAV ROBERT KIRCHHOFF.

The death of this distinguished *savant*, in October last, has already called forth eulogies in the technical and scientific journals; but it is not too late for me to add a few words of affectionate personal reminiscence, as well as of critical appreciation concerning an inspiring exemplar and beloved teacher.

The career of Prof. KIRCHHOFF seems uneventful to those who recognize as noteworthy events great vicissitudes, startling adventures or noisy victories only. But in the realm of thought this quiet life was one

of splendid achievement. KIRCHHOFF devoted himself to physics at a time when this science, emancipated from the dogmas of the past century, was just beginning the most brilliant era of its history. The undulatory theory of light had at last established itself; the experimental data concerning magnetism and electricity were beginning to arrange themselves in orderly form; in short, physics needed only the help of mathematics to become truly a science, and with that help was about to disclose the great, illuminatory discovery of the conservation of energy, and others scarcely less important. KIRCHHOFF was characteristically not an experimental investigator (though not deficient in this respect) but a mathematician. His complete and elegant mastery of mathematical analysis enabled him to discover not merely facts, but their relations and laws. Without such men the labors of mere experimenters would produce but a chaos of data without arrangement or meaning.

He was born in 1824, at Königsberg, in Prussia, and studied at the universities of that town and of Berlin. In 1850 he was called as Professor to Breslau, and in 1854 to Heidelberg, where he remained until 1875, when he became a professor at the Berlin University, and remained in that position until his death.

It was at Heidelberg, and in collaboration with the distinguished chemist, BUNSEN, that he made the great discovery of spectrum analysis, which contributed most to his fame. The sublime results of this discovery entitle it to be placed by the side of NEWTON'S law of gravitation. As NEWTON made possible the analysis of the movements of all visible bodies in stellar space, and the demonstration that they obey one law, so KIRCHHOFF and BUNSEN made possible the analysis of their substance, and the demonstration that they contain, certainly many, and presumably all, of the elements of which the earth is composed. The horizon of human knowledge has thus been infinitely widened. In many other directions, the uses of spectrum analysis have been most valuable to man. Yet none of these applications, whether cosmical or terrestrial, constitute the real discovery of KIRCHHOFF, apart from the ingenious experimental illustrations and proofs, which we may suppose that BUNSEN principally supplied. That discovery was essentially mathematical—the law, namely, which afforded a new revelation of the nature of light, and the theoretical explanation of innumerable observed phenomena. This law has been stated thus: that for a given temperature, color and condition of polarization, the relation between the capacity of emission and the capacity of absorption of light or radiant heat is for all bodies the same, *i. e.*, independent of the nature of the body. (I translate this condensed statement of the law from an elaborate article by Prof. AUGUST HELLER, of Pesth, in the *Algemeine Zeitung*, to which I am indebted also for other foregoing facts.)

KIRCHHOFF'S numerous essays on physic-mathematical subjects betray everywhere the same skill and insight. His demonstrations are not merely clear and conclusive, they are beautiful. But it is not to these qualities in him that I would devote the remainder of this article, but to the man and teacher, as I remember him at Heidelberg, in 1858. There were many brilliant lecturers at the famous old university in those days—specialists who drew from all quarters of the world each his own audience. MITTERMAIER in law, ROETHE in theology, HAEUSSER in history and politics, BUNSEN in chemistry, SCHMIDT in botany, were all strong men. KIRCHHOFF was comparatively young and unknown: but his lecture room was crowded, and he was greatly admired and beloved. Slight in figure, delicate in feature, clear eyed, light haired, timid, and almost feminine in manner, he commanded a respect which was not always shown to other lecturers. His invariable courtesy, and a sort of innocent reliance upon our attention and interest appealed to our chivalry, and the wonderful precision and grace of his language speedily fascinated us. We could not afford to lose one of those low, gentle words.

In experimental illustrations he was deft and successful. They rarely failed in his hands. One occasion is printed like a picture on my memory. It was during a lecture on electricity, and the Professor had undertaken to repeat before the class VOLTA'S famous experiment with a recently-slain frog. To secure success it was necessary to put the frog to death immediately before the experiment, and this was done by the Professor in our presence. KIRCHHOFF'S tender heart seemed to unnerve his delicate hands. Trembling with evident compassion, he held the frog in one hand, so that it projected over a merciful basin of ether, while with the other hand, armed with a huge pair of shears, he cut off the animal's head. The picture in my mind is that of the critical moment, just before the head fell—the dear young Professor, shutting his eyes as he braced himself for the necessary deed; the students, tempted to laugh, but held in silence by sympathy for him; and the frog, blinking unconcernedly, the only indifferent being in the room.

The peculiar affection of KIRCHHOFF'S students towards him was, at the time of which I speak, influenced, doubtless, by his very youthful appearance. But later on, it acquired another cause. In 1867, he received an injury causing a permanent lameness and feebleness of health. For some years he lectured from a rolling-chair, and for a long time afterwards was obliged to go on crutches, and ultimately to support himself with two canes. I suspect therefore that to the very end, even after he had been covered with orders and titles, and crowned besides with the gray hair of age, his students cherished him with a tenderness like that which we felt, who sat before him on the banks of the Neckar, nigh upon thirty years ago.

R. W. RAYMOND.

ALUMINUM BRONZE FOR GUNS, PROPELLER-WHEELS, ETC.

In a very interesting paper recently read by Mr. ALFRED H. COWLES before the Naval Institute, at Annapolis, much important information was given concerning the little-known properties of the aluminum alloys, which appear to especially qualify some of them for use as a gun metal and other purposes requiring similar properties.

Mr. COWLES pointed out the requirements of an ideal gun; it must be "of minimum weight and simplest construction," "able to resits a maximum internal pressure:" "it must be of one piece, in order to act like a great spring; it should respond very stiffly to the pressure of the powder gases, always perfectly recovering its original form, and its walls should be hard enough to withstand the abrasive action of the projectile. For safety, this great spring should have the property of stretching much beyond its elasticity; thereby danger of violent explosion is avoided." "Its value is measured by its destructive power, and its life, as related to its cost and its weight."

These conditions, Mr. COWLES endeavors to demonstrate, are best fulfilled by some of the aluminum alloys, and undoubtedly he supported these claims with extremely strong evidence, as is shown in the accompanying tables I. and II.

Table I. gives the average physical properties of the metals now used in the fabrication of guns.

TABLE I.—PHYSICAL PROPERTIES OF GUN METALS NOW USED.

METAL.	Elastic limit.	Elastic extension per unit length.	Tensile strength per square inch of original section.	Elongation per centum after rupture.	Contraction of area per centum.	Modulus of elasticity.	Compressive strength per square inch.	Hardness U. S. standard.	Specific gravity.
	Lbs.		Lbs.			Lbs.	Lbs.		
STEEL. Average properties of 137 specimens of accepted gun steel from hoops, jackets, and tubes, oil tempered and annealed, U. S. Government tests.	51,611	0·00207	96,150	19·93	41·	About 29,000,000	..	21·4	7·86
Same grades of steel not oil tempered and annealed, average of 19 specimens	38,142	0·0016	88,000	18·7	31·	..	..	14·9	7·86
Cast gun steel, German soft (Alexander Holley, "Ordnance and Armor")	35,392	0·00096	70,784	.	..	..	200,000	..	7·8
WROUGHT-IRON FORGINGS.									
Small Bars { Hig'st / Mean.	30,000 / 18,000	0·0065 / 0·00065	73,000 / 53,000	.. / 26·	..	.	80,000	..	7·77
Heavy forgings, average of 700 tests at Sir Wm. Armstrong's works	23,760	..	48,160	..	..	..	..	..	..
CAST IRON. Average of four Watertown tests of accepted iron	17,000	0·0009	30,000	0·166	nil	.	125,000	12·96	7.25
GUN BRONZE Average of fourteen Watertown tests	13,214	0·0012	38,995	33·6	33·0	..	..	6·	8·12

These figures are certainly very remarkable, but they have been surpassed by recent tests made on the government testing machine, at Watertown, Mass., on bars of standard gun metal such as is used by the government in guns and for propeller screws, and Cowles aluminum bronze. The tests were made at the suggestion of Chief Engineer MELVILLE of the navy, with the object of ascertaining the adaptability of the aluminum bronze for the screws of the new naval vessels.

The bars were all 22 inches long, 15 inches between the shoulders, $1\frac{5}{8}$ inches diameter, having an area of 2·7 squares inches, being thus unusually large test pieces, the largest yet tested at Watertown.

The government standard bronze used in guns and propeller screws has the composition Cu, 88; Zn, 2; tin, 10.

The Cowles alloys tested were: A, composition: Cu, $89\frac{3}{4}$; aluminium (and a little silicon), $11\frac{1}{4}$.

Table II. gives a slight insight into a field of aluminum alloys which up to the present time has scarcely received investigation. On the testing machine at the works of the Cowles Electric Smelting and Aluminum Company, at Lockport, N. Y., higher results have been obtained, and other alloys made in small quantities whose physical properties have surpassed these.

TABLE II.—PHYSICAL TESTS ON A FEW ALUMINUM ALLOYS.

ALLOY TESTED.	Diameter in inches.	Cross section in square inches.	Length between marks in inches.	Elastic limit, pounds per square inch.	Elastic extension per unit length.	Tensile strength, pounds per square inch of original section.	Elongation, per cent.	Contraction of area, per cent.	Hardness.	Modulus of elasticity.	Specific gravity.	
A_1 bronze, old name special composition, Cu 89, Al 10 Si 1	0·5	...	2	...	...	114,514	4·5	·0	...	...	7·56	Washington Navy Yard Tests, February 16th, 1886.
	0·501	...	2	69,749	...	95,366	0·5	·6	...	...	...	
	0·501	...	2	79 894	...	109,823	0·5	2·39	...	...	...	
Bars cast in sand, maximum strength sought	...	·0646	1	...	...	128,000	·3	·0	...	...	...	Tested at Leeds Fge., Eng.
	0·304	...	1	...	...	97,580	·0	...	...	...	...	Watertown Testing Machine, July 11th, 1887.
	0·315	...	1	...	...	115 260	·0	...	...	...	...	
	0·272	...	1	...	...	118 590	·0	...	...	...	...	
*A_1 bronze, forged at red heat	·798	·5	10	38,000	0·00232	81 700	5·2	11·4	...	17,544.000	...	Watertown tests, April 29th, 1887.
	·798	·5	10	41,000	0·00259	87.600	2	8·6	...	17.241,000	...	
A_2 bronze, cast in sand	·321	·0809	1	...	...	87,510	17·	...	...	...	7·65	Watertown tests, July 11th, 1887.
A_2 bronze, forged	·503	·199	2	...	...	83,820	35·5	43 2	...	...	...	
A_3 bronze, composition Cu 91¾ per cent, Al 7½ per cent, Si ¾ per cent. Cast in chill mold	...	1	6	21,500	0·00133	69,800	32·8	32 1	13·46	16,520.000	7·8	Watertown, July 11th, 1887.
	...	1	6	24,000	0·0018	68.000	18·2	26·1	11·8	16,300,000		
	·312	...	1	...	...	74,770	25	...	...	...	...	Watertown, July 11th, 1887.
	·327	...	1	...	...	68,930	48	...	...	...	...	
	·327	...	1	...	...	71.790	40	...	...	...	...	
Aluminum brass No. 1. Composition, 71¼ per cent Cu, 3¾ per cent Al, 25 per cent Zn. Cast in chill.	...	1	6	21,500	0·0018	63.450	11·2	23	9·2	14.070.000	...	Watertown, July 11th, 1887.
Aluminum brass, No. 2. Composition, Cu 63⅛, Al 3⅛, Zn 33⅛. Chill casting	...	1	6	47,000	0·0091	76.800	3·5	8·4	12·6	13,490,000	...	Watertown, July 11th, 1887.
Small bars cast in sand. Made by Brush Electric Company	·306	...	1	...	...	91.500	9	11·4	...	...	...	Watertown.
	·296	...	2	...	...	88.950	4	7·3	...	...	...	

* Compression tests of A_1 forged bars, 2 inches × ·798 inch diameter, 160,400 pounds to the square inch, and 153,600 pounds to the square inch: Watertown, April 29th, 1887.

A_2 contained 10 per cent aluminum; A_3, 8½ per cent aluminum No. 2 aluminum brass, which had the composition Cu, 63⅛; Zn, 33⅛, and aluminum, 3⅛ per cent, was also tested, and gave extraordinary results.

The test bars were cast in chills and in sand. The results of the tests were as follows:

Government bronze, 18,000 to 23,000 pounds tensile strength, and 9000 to 13,000 pounds elastic limit; elongation, 2 to 5 per cent.

Cowles A_3 bronze, 61,000 pounds tensile strength, 18,000 pounds elastic limit, and 26 per cent elongation.

Cowles A_3 hard, 66,500 pounds tensile strength, 24,000 pounds elastic limit, and 13·3 per cent elongation.

Cowles A_2 bronze gave 66,000 pounds tensile strength, 28,000 pounds elastic limit, and 4½ per cent elongation.

Cowles A_1 gave 72,500 pounds tensile strength, 33,000 pounds elastic limit, and 3·6 per cent elongation.

Cowles B_1 bronze; 58,500 pounds tensile strength, 19,000 elastic limit, 23·7 per cent elongation.

Cowles No. 2 brass showed the following wonderful properties: 82,800 pounds tensile strength, 65,000 elastic limit, and 3½ per cent elongation.

These results are all very remarkable, and show that the weight of propeller screws can be reduced to about one third what they are at present, while retaining even greater strength and elasticity. This is a very important consideration now that every pound of superfluous weight dispensed with permits the increase in the offensive and defensive powers of the vessel.

The use of some of these metals cast in guns promises to give a considerably stronger and a cheaper gun than built-up steel, or as Mr. COWLES stated in the paper referred to above, "We have shown that the strength of the bronze is so great that the finished gun need weigh no more, if as much, as a steel gun of like calibre. Hence we arrive at the fact that to-day heavy guns of aluminum bronze can be made at twenty per cent less cost to the government than like guns of steel; and further, sixty-eight per centum of their cost is represented by capital stored away in the form of a valuable metal that can be remelted and used over any number of times without alteration of its composition."

The properties which are so important in guns are those which are desirable in heavy machinery and other uses where strength and durability are required, so that these results have a very wide interest. The extraordinary results obtained with a cheap bronze or brass composed of one third zinc are perhaps more remarkable than those of the high-grade copper bronzes. We shall refer again to this subject when reviewing the discussion on Mr. Cowles' paper.

Neosote.—Neosote is the name given to a new preservative, similiar to creosote in properties, and now being prepared on a large scale from the phenoloids which occur in the blast-furnace creosote oil. This oil is used as a liquid fuel, and also for the "Lucigen" light, and for creosoting timber. The new antiseptic is prepared from it by heating the crude mixture with caustic soda, by which a considerable percentage of phenoloid bodies are dissolved. The crude sodium phenols obtained in this manner are next purified from the acrid and irritating compounds with which they are associated, and has then no color. On exposure to the air for some time it gradually becomes sherry red in color. It is found to be less caustic than carbolic acid, although equal to it in its antiseptic and disinfectant qualities, and can be employed as a substitute for it and wood tar creosote.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Barrel Chlorination and Newbery-Vautin Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I read with pleasure your article on the "Newbery-Vautin Chlorination Process" in your JOURNAL of December 10th, and indorse every statement you make therein. My experience with thousands of tons by the barrel process, covering a period of over six years, has not alone demonstrated the success without pressure, but its actual advantages, and any chlorinator working with gas pressure will soon abandon it as a nuisance and absolutely useless.

Whatever merit is claimed is surely not in pressure nor in vacuum filter, and least of all, in charcoal precipitation. I have failed to see anything better than we have practically demonstrated for years.

Very truly yours, A. THIES.

PHŒNIX MINES, N. C., Dec. 18, 1887.

Native Gold-Silver Alloy.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Kingston camp, proper, has heretofore been a producer of sulphide ores, pyrite galena, chalcopyrite, blende and pronstite, with some chloride near the surface, being the silver bearing minerals.

Some fine specimens of native silver have been found, but the proportion of native silver in the ore is small; lately, however, one of the mines has been producing an unusual amount of native silver, in wire and leaf form. All or nearly all the specimens, are slightly discolored and yellow.

With this native silver is found an alloy, the approximate composition of which I wish to note in your columns.

Mr. Geo. E. Hall, the manager, recognized a similarity in appearance between it and the gold and silver alloy of the Sheridan mine, San Juan, Col, and kindly furnished me with some of the first specimens produced.

The alloy occurs in grains and wires in quartz; the color is light straw-yellow. I was unable to get a satisfactory determination of the specific gravity with the appliances at my disposal, and for the same reason can not furnish a full analysis.

A careful assay of the melted alloy gave me the percentage composition shown below, the second assay is one furnished me by Mr. Hall from another sample.

	I.	II.
Gold	61·69 per cent.	58·10 per cent.
Silver	34·41 "	41·90 "

The difference would seem to indicate a variable composition, but I am rather inclined to think that a small amount of native silver, slightly discolored and yellowish, was included in the second sample.

I am sorry I can't give the composition of the Sheridan alloy. In color and appearance they are identical. Mr. Melville Atwood gives an analysis of a somewhat similar alloy from the Comstock lode (*Silliman's Journal*, 1875, IX., page 229), which contained: Gold, 55·37 per cent; silver, 42·87 per cent; undetermined, 1·74 per cent.

This is, so far as I can find, the first occurrence of any native alloy in the Kingston District. The ores are, as a rule, very low in gold.

The same mine, the Caledonia, also produces fine specimens of alabandite, or manganese sulphide. FRED. W. TAYLOR.

KINGSTON, N. M., December, 1887.

Systems of Mining in Soft Ore Bodies.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your criticism on the system of mining employed in the Chapin mine calls for an answer.

The statement that "the Chapin has tried nearly every known method of work" is inaccurate.

"The system of working out the ore in sections from the bottom up" I have not described nor is it now in use here. In the Chapin, the upper

sections are mined out first. In each section, however, the ore is worked out by backstoping.

When you further say: "The system now in use does not appear to us to contain the elements of permanent success," let me remind you of its history. It was first tried in Europe 140 years ago, and has ever since given good satisfaction there. It is at present the pre dominant system in the German and Austrian soft ore mines, and I think that you will readily admit that the Germans are good miners. Dr. Friedrich Wimmer, for instance, a man known to the world not only as an editor of one of our best mining journals—the *Berg- und Huttenmennishe Zeitung*—but also as a practical miner, makes use of it in the Rammelsberg mine, which is worked under his immediate supervision.

After stating that the chief drawback to the present system is the enormous amount of dead work done, you make use of the tables presented in connection with my paper on the Chapin mine, and say: "In 1886 this amounted to 10,159 feet of drifts, 1,938 feet of winzes, and 242 feet of shafts—for an output of less than 200,000 tons." But, Mr. Editor, is this statement fair? The fact is, that said amount of dead-work gave access to more than twice as much ore as was mined during the same year. If you want to get an approximate estimate of the opening expenses for a longer period, you can figure from the plans and data given in my paper, and you will find that they are not at all enormous.

In regard to other practical difficulties that you refer to, I will not deny that they present themselves. The filling, which can not be put in for nothing, settles somewhat, and the back follows gradually, and no attempt is made to recover the light sets of timber used. "Close timbering" is, however, not put in, but very nearly all the ore is worked out safely.

Hoping that you will soon publish your "radically different solution of the subject," and that you will admit a fair discussion of the subject, I am yours, very respectfully. PER LARSSON.

IRON MOUNTAIN, Mich., Dec 13, 1887.

Oxide of Iron in Steel.

(*Continued from page* 446.)

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I agree with Mr. Howe, that the spiegel reaction method gives us only a rough notion of the percentage of the oxygen in steel.

I have repeatedly compared the oxygen thus obtained with laboratory tests and have been unable to obtain concordant results.

The hydrogen method I have found unreliable.

Tucker's method is better, but it is open to the objection that the amount of oxygen is determined by difference: consequently all experimental errors are heaped upon the oxygen given, and unless great care be taken correct results can not be obtained.

Carbon reacts on iron oxide even at as low a temperature as 800 degrees, and it follows that as long as the ingot is red hot that carbon must reduce the iron oxide presumably present, with a consequent evolution of carbonic oxide. As instanced, a bar of rolled steel * was divided into two parts.

No. 1. Cold filings, drilled from the center of the bar, treated by the bichromate of potash method gave, iron oxide, 0·532 per cent.

No. 2. Over heated, cracked slightly in rolling, gave iron oxide 0·200 per cent.

I may add that ordinary Bessemer steel when heated evolves carbonic oxide but slightly in excess of the theoretical quantity due to the reaction of carbon on the iron oxide, as determined by my method.

§ 167. Oxygen with carbon:

It is well known to chemists that to completely remove a given element when in solution, an excess of the proper reagent must be used, or, if otherwise, time must be allowed for the slower reaction. A small quantity of barium sulphate, practically insoluble in acid, I have found to be retained in solution, and either barium or sulphuric acid may be precipitated at will. In the first instance, barium, by adding a slight excess of sulphuric acid, in the latter, the addition of a little barium salt determining the precipitation of sulphuric acid. This, so far as my experience goes, may be termed a general law, and applicable to all chemical reaction.

It is, therefore, not surprising that carbon, silicon, etc., coexist with oxygen in molten steel. It would appear that to completely eliminate oxygen, a slight excess of carbon or silicon should be added; but, as all steel manufacturers know, the remedy would be worse than the disease.

Yours truly, JOHN PARRY.

EBB VALE IRON and COAL COMPANY, Dec., 1887.

Reply of Mr. H. M. Howe.

It is very gratifying to find that the views of so astute a chemist as Mr. Parry harmonize so closely with those which, with some reluctance, I have ventured to make concerning these analytical processes, a subject which I had to approach with the obscure vision of a bystander, while he views it in the incomparably clearer light of his rich experience.

HENRY M. HOWE.

Alien Ownership of Land.—The Senate Foreign Affairs Committee has reported in favor of amending the act to forbid alien ownership of land in the Territories and District of Columbia, by striking out the resolution as to the District of Columbia. It is found that the act, as it stands, creates unforeseen embarrassments in regard to the property of the foreign legations here. The amendment should also exempt the ownership of mines from the operation of the act.

An Extraordinary Feat in Coal Mining.—Mr. Richard Sneddon, superintendent in charge of mine No. 4, Rock Springs, Wyoming, Union Pacific Railroad, reports that on October 10th last he, with the assistance of one man, with one Legg coal mining machine, carrying a three-foot cutter bar, between the hours of 7 A. M. and 5:30 P. M., undercut in rooms averaging from 24 to 30 feet wide, 195 lineal feet face, 5 feet under, producing in this 10-foot seam 325 tons of coal. This is certainly an extraordinary day's work. Mr. Sneddon is to be congratulated for this accomplishment. The Jeffrey Manufacturing Co., of Columbus, Ohio, are the manufacturers of the Legg machine.

* No. 1 cold steel. Si, ·032; P, ·095; S, ·057; Mn, ·72; Carbon, ·30); iron oxide, 0·532.

BRAZILIAN MINING LAWS.

The following circular letter hints at the appreciation Brazilians have of the decadence of all mining industries in that Empire, and gives, at the same time, an epitome of the mining laws of that country.

The Minister of Agriculture of the Brazilian Empire directed the following circular letter to the Presidents of the provinces on the 21st of October:

SIR: The innumerable concessions made by the Imperial Government for the exploration for minerals in different parts of the Empire have not given appreciable results, the concessioners having failed to put their work into execution, either through lack of means to operate the mines, or on account of the insufficiency of their returns. From this has resulted a decadence of the mining industry, because the lack of success, though due to these causes, and not to the absence of subterranean riches, destroys all incentive to action, and these riches remain buried with no one sufficiently active to properly take advantage of them. I therefore think it expedient to recommend that you inform this ministry in regard to the present condition of the mining industry in your province, reporting the explorations and minings now in active operation, and those which have been abandoned, and informing me of the date since when the following clauses to which all persons are subject who mine in your province have been known.

I. There is hereby conceded to ——— the term of one year, counting from this date, within which we shall begin exploration for the discovery of mines of ——— in the municipality of ———, in the province of ———.

II. Within the term specified the concessioner shall present at the office of the Minister of Agriculture a topographical and geological map of the lands explored, together with profiles showing, as far as possible, the superposition of the mineral beds, accompanied by specimens of the minerals discovered, and he shall set forth in a detailed report the richness of the mine, its extension and direction, its distance from the nearest towns or villages and the present means of communication.

III. The concessioner shall be obliged to make good all damages caused by his work to contiguous property; to turn back into their natural channels, at his own expense, waters that he may have turned aside for his mining operations; he shall not disturb the supply of any towns; he shall properly direct the water which may flow from his excavations, and when lands are overflowed he shall drain and restore them to their former condition in order that the health of those living in the neighborborhood may not be injured.

IV. This concession entitles the holder to an area of 1000 square meters in any part of the municipality, and these lands, while being explored, can not be occupied or selected for the same purpose by other parties during the existence of this concession.

V. When the above-mentioned clauses are complied with authority will be granted for the operation of the mine or mines discovered in the localities indicated, the superficial area not to exceed one mineral *data*.

Seeking the welfare of the State in the execution of the laws and in the endeavor to render productive an industry which should be a source of wealth to the State, I urge upon you that instructions be given in accordance with the above disposition, in order that the requirements may duly reach this office for the concessions guaranteed to the explorer for minerals. (signed) RODRIGO DA SILVA.

COMPARISONS OF COST OF UNDERGROUND HAULAGE BY VARIOUS SYSTEMS AND TRANSMISSION OF POWER BY ROPES, STEAM, WATER, COMPRESSED AIR, AND ELECTRICITY.

A few brief extracts from papers, comparing the cost of electricity with the power derived from steam, compressed air or hydraulics may be interesting. The following is given by Professor Schulz (Proc. Inst. Civil Engineers, Vol. LXXVIII., page 67, and Transac. N. of Eng. Institute of Engineers, Vol. XXXIV., page 5):

TOTAL COST OF UNDERGROUND HAULAGE BY LOCOMOTIVE.

	Per ton in pence.
Steam engine	1·00
Electric engine	1·54
Compressed air engine	2·06

TOTAL COST OF VARIOUS SYSTEMS OF UNDERGROUND HAULAGE.

Endless chain	0·98
Rope and counter rope	1·26
Electric locomotive	1·54
Rope and tail rope	1·89
Endless rope	2·83

A comparison between electric transmission and mechanical methods for the same was published in Berlin in 1883, by A. Beringer, and awarded a prize by the Electro-Technical Society there. A *résumé* of it appears in the *Revue Universelle des Mines* (*ser.* 2, *tome* XV., page 522). The following brief extract may be of interest.

COMPARISON ON COST OF TEN EFFECTIVE H. P. HOURS—TRANSMITTED 1093 YARDS.

	Pence per eff. h. p. per hour.
By cables	1·77
" electricity	2·21
" hydraulics	2·90
" compressed air	2.98

COMPARISON ON COST OF FIFTY EFFECTIVE H. P. HOURS—TRANSMITTED SAME DISTANCE.

By cables	1·35
" hydraulics	1·87
" electricity	2·07
" compressed air	2·27

COMPARISON OF COST ON TEN EFFECTIVE H. P. HOURS—TRANSMITTED 5465 YARDS.

By electricity	2·64
compressed air	4·66
cables	4·69
hydraulics	5·29

COMPARISON OF COST ON FIFTY EFFECTIVE H. P. HOURS—TRANSMITTED 5465 YARDS.

electricity	2·37
cables	2·85
compressed air	2·99
hydraulics	3·02

Steam power was used in each instance, and from the above figures it

must be inferred that for distances of about 1000 yards cable transmission costs least; but that in longer distances electricity takes the lead, and maintains it against all other systems.

The cost per effective horse-power per hour of electrical pumping plant herein described, is found by the figures already given to be 1·18 pence. It is therefore obvious that a future is before electricity for the transmission of power. For coal cutting it affords a ready means of distributing power; and for hauling engines, either stationary or made capable of running to various parts of the colliery on prepared tracks, as well as for pumping, this new electrical method must take a place, and that an important one, in the future of colliery working.

METHODS OF MINING IN SOFT ORE BODIES.

Written for the Engineering and Mining Journal by James H. Goudie, C.E.

The following system of mining, which is practiced in one of the largest mines in the north of England, may be of interest to the readers of the ENGINEERING AND MINING JOURNAL:

The ore in question is considerably softer than the ore found in the Gogebic District, but the conditions under which it is found very closely resemble those that exist here. The deposit is in the form of a vein of an average width of 60 feet, and dipping at an angle of 46 degrees from the horizontal.

The vein crops out immediately under the surface, and preliminary boring operations had proved it to extend down a distance of at least 900 feet, and arrangements for working were designed accordingly. The shaft, an inclined one, was sunk in the foot-wall at the same angle as the vein, and with a barrier of solid rock between it and the ore of 90 feet. This great width of barrier was, however, due to surface arrangements, or probably 50 feet would have been deemed sufficient.

At every 60 feet from the top of the ore main cross-cuts are turned off the shaft and off these longitudinal levels or drifts are driven, one along the foot-wall and the other along the hanging-wall, these levels being connected at regular intervals by cross-cuts, leaving pillars about 30 feet wide. These levels and cross-cuts having to stand till the ore above them has been removed, are strongly timbered, the "sets" being placed close together. From these levels and cross-cuts "rises" are put up in the ore till the old workings in the level above have been reached, or in the case of the first series of "rises" until the surface is met with. There are two "rises" in each cross-cut, one sloping along the foot-wall and the other vertical if the width of vein will allow between the foot and hanging walls. At the top of the "rises" levels and cross-cuts are driven in the ore similar to those which are going forward in the bottom height, the ore from the upper workings being poured down the "rises," which are fitted with hopper mouths, and the "bogies" or small cars convey it from there to the shaft. When these upper levels have reached the extremities of the mine, then the pillars in these levels are brought back, beginning to rob them at the side furthest away from the shaft, and in this way the entire ore immediately adjoining the furthest in pair of "rises" is removed. When this has been completed, work in this part of the mine is stopped and the roof allowed to fall. So soon as this takes place and every thing is quiet again, which, in the case of this mine, takes about a week, work begins afresh a height lower in the "rises," and levels and cross-cuts driven and the pillars removed as before. At the same time that this second height is being worked, the pillars adjoining the No. 2 set of "rises," numbering backward from the extremities of the mine, are being removed. The ore is worked in heights of about 9 feet, and after the mine has been fairly at work for some time, the longitudinal section has a stairlike or terraced appearance, the working from the No. 1 set of "rises" being 9 feet lower than those from the No. 2 set, and those from the No. 2 set 9 feet lower than those from the No. 3, and so on with the others.

The work of removing the pillars, driving a fresh set of levels and cross-cuts, and the sinking of the shaft itself all go on simultaneously, so that although there is a temporary stop of a week occasionally to allow the roof to drop, this does not interfere in any sensible degree with the regularity of the output.

The timber used in this system of mining consists of larch posts and caps, from 8 feet to 12 feet in diameter, with 1½ inch boards, as laggin for roof and sides of drifts. The "sets" of posts and cap being place close together, as in the main levels, or from 3 to 4 feet apart, as in th workings.

In addition to this timbering, it is found beneficial to lay 1 inch board ing on the floor of the workings, as the pillars are being removed, and th boards thus laid form a capital roof for the next set of workings and a the same time prevent the débris from the fallen roof, surface, etc., intermixing with the ore.

The timber cost runs from 20 to 25 cents per ton, with timber costing from 30 to 35 cents per cubic foot. In the Gogebic district, the cost of timbering on a similar system would probably in no case exceed 10 cents.

As to the comparative safety of this system of mining, the superintendent of the mine referred to says: "It is a very safe method of working, as it closes down quietly behind the men who are removing the pillars and thus obviates any large 'caving in' of roof. When a few levels, or rather heights, have been worked out, the roof is so interwoven with the timbering that we have never had any men hurt by falls from the roof.

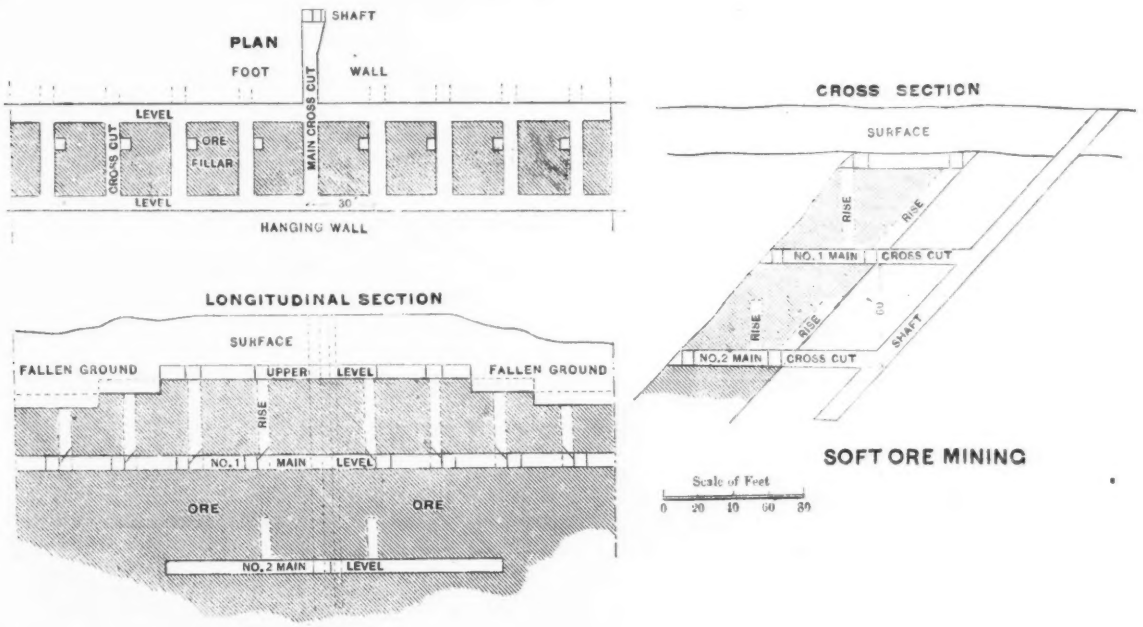
The essential features of this system of mining are:

1. That the shafts shall be so situated that the removal of the ore will in no way injure them, In such a district as this presumably in the foot-wall.

2. That the first or partial working of the ore by means of drifts and cross-cuts from each main cross-cut shall have reached the extremities of the mine before the second working or complete extraction of the ore is begun.

3. And that the removal of the pillars shall begin at the set of "rises" furthest from the shaft, and be carried on regularly and systematically.

The advantages of such a system are: that it gets all the ore; that it is comparatively safe; that it would work equally well at any depth; and that, for a large body of ore, it would probably be cheaper than the system usually practiced here, or than that described in Mr. Larsson's paper.



SOFT ORE MINING

MANUFACTURE OF CHLORINE FROM CHLORIDE OF MAGNESIUM.

On the 5th December, at a meeting of the Society of Chemical Industry, held at Burlington House, the President, Professor Dewar, described the new process at work at Salindres for manufacturing chlorine by the magnesium process, which he said was founded upon the 1884 patent of the late Mr. Walter Weldon, and perfected since his death by the skill, as chemical engineers, of MM. Pechiney and Boulouvard. Numberless patents have been taken out for chloride of magnesium processes for the purpose; hitherto they have all been failures, because the chemical side of the problem was not nearly so difficult as the engineering side. In this process, the oxychloride of magnesium is made by treating magnesia with hydrochloric acid; the saturated solution is run off as clear fluid, then is slightly concentrated and passed into a vessel having a rotary motion; more magnesia is next added to it, and it gets hot; finally it becomes solid oxychloride of magnesia, and by the machinery is broken into lumps of about the average size of a walnut. These hard little lumps are transferred to a desiccator, in which their aggregated large surface is exposed to the heated gases coming from the regenerator; trucks are then filled automatically with the dried lumps. The results of the desiccation process are shown in the accompanying table:

RESULTS OF DRYING OXYCHLORIDE OF MAGNESIUM.

Equivalents of MgO per equivalent of Cl in the oxychloride.		Percentage of Cl in the oxychloride.		Per centage of water in the oxychloride.		Per cent of Cl lost in wet oxychloride.	Per cent of water disengaged in wet oxychloride.
Wet.	Dry.	Wet.	Dry.	Wet.	Dry.		
1·333	1·359	26·73	42·89	44·27	30·89	1·12	44
1·394	1·511	25·91	32·05	44·97	29·81	4·67	49
1·343	1·531	25·80	32·73	45·93	27·97	7·43	55
1·346	1·511	26·16	33·30	45·16	27·09	6·60	57

The lumps are afterwards transferred to the furnace, and as oxychloride of magnesium is so bad a conductor of heat, it would not do to attempt to heat them in a retort; the furnace is therefore a mass of brick work, with the necessary spaces to hold the material, which has to be operated upon at a white heat, applied by means of what is really a regenerative burner, in which the combustible gases and the air are heated before they enter into combustion. The waste heat of the gases is used for desiccating the oxychloride. The regenerative burner is not fixed, but is moved along, as required, from furnace to furnace. The two French chemical engineers already mentioned, having gained experience by their first experiments on a large scale, are now increasing that scale by building a plant for turning out six tons per day, instead of three quarters of a ton as in the past.

In the next part of the process a supply of air is drawn through the furnace, and under its action the heated oxychloride of magnesium suffers decomposition, giving off chlorine; this takes place at diminished pressure. The hot gases pass from the furnace at a red heat, to an ingenious condenser, consisting of a mass of glass tubes through which cold water runs; the tubes are slightly inclined from a horizontal position, every care being taken to avoid the introduction into them of air bubbles, for it was found that the latter caused them to burst; with the care now taken to keep out air bubbles, the bursting of a tube is of rare occurrence; when it takes place, the particular tube is thrown out of circuit by a care-taker, and before long is readily replaced by a new one. When the magnesia is withdrawn from the furnace it is red hot, and being such a bad conductor does not cool down thoroughly during the night; it is therefore artificially cooled by rotation in a kind of "agitator," after which it is ready for dissolving in the hydrochloric acid once more, the process being a continuous one. In a single heating the whole of the oxychloride is not completely decomposed, but the undecomposed pieces are hard, and are easily picked out, to go once more into the furnace. The following table indicates what takes place:—

DECOMPOSITION OF OXYCHLORIDE OF MAGNESIUM.

Weight of chlorine charged.	Percentage of Cl remaining in residue.	Per cent of Cl charged.			Per cent of total Cl disengaged.		Weight of free Cl per operation.	Maximum richness in Cl of the gas.
		Total Cl discharged HCl + Cl.	Free Cl	HCl.	Free Cl.	HCl.		
kilo.							kilo.	
415	17·60	82·40	42·40	40 00	51·40	48·60	176	6·25
408	19·00	81 00	42·90	38·10	52 96	47 04	175	6·45
414	16 00	84·00	44·68	39 32	53·20	46·80	185	7·15
420	15·00	85·00	45·23	39·77	53·20	46·80	190	7·78

The principle at the root of the matter is of the nature of reversible decomposition, the oxygen in the one case causing chlorine to be given off, as known to Davy, and the chlorine in the other case giving oxygen, as known to Graham, although the facts seem to have been omitted from chemical text-books of recent times. The old Weldon process, he said, is a cheap one in plant and maintenance; the new one is complicated and expensive in these two items, but the results have given the French inventors such confidence that they are increasing their plant, and they calculate that afterwards they will be able to obtain the following results:

COST OF PRODUCING ONE TON OF CHLORINE ON A WORKING SCALE OF SIX TONS PER DAY.

At Salindres.	Fr.	In England.	Fr.
Coal, 4000 kilo. at 12 fr	48·00	Coal, 4000 kilo. at 6 fr	24·00
Labor	45·00	Labor	45·00
Repairs, etc	20·00	Repairs, etc	20·00
Loss of magnesia, say	5·00	Loss of magnesia, say	5 00
	118·00		94·00

The main feature of the process is the economy of hydrochloric acid They calculate that for every ton of chlorine made, there will be an economy of two tons of absolute hydrochloric acid. Chloride of calcium can easily be changed into chloride of magnesium by means of its reaction with carbonic acid, and Professor Dewar considered this point to be interesting to alkali manufacturers. Some works at Stassfurt are now wasting 70,000 tons of dry chloride of magnesium annually, by running it in strong solution into the river. By this process they may perhaps be able to save the chlorine, and to use the solid residue as a cement.

In the discussion which followed, Sir Henry Roscoe said that the machinery described was one of the greatest triumphs of chemical engineering he had ever seen; it was further a remarkable thing that red hot chlorine could be brought as described into contact with cold glass tubes without breaking them. He, and also Sir Fred. Abel, Mr. Howard, Mr. Muspratt, Mr. Fletcher and others spoke of the necessity for more technical education of workmen and masters in England, and Mr. Gamble remarked that if the new invention succeeded it would be a very serious thing for the trade of this country. At Stassfurt they could get their chlorine for nothing, and in that lay the real danger. Professor Dewar, in the course of his reply, said that the plant he had described cost twice as much as the old Weldon plant for the same scale of working.

LEATHER LINK BELTING.

There is nothing very novel in the principle of making leather belts in links, for thirty years ago Mr. C. M. Roullier, of Paris, experimented with small leather links one and one half inches long by three quarters of an inch wide. These links had two small holes at equal distances apart, and were joined with iron bolts, which were riveted at the ends, thus making a perfectly flat surface, and in that way forming a belt entirely of leather links.

Mr. Roullier's idea was to economize: he therefore utililized the material left over from the manufacture of flat belting. He perfected his belt and came to this country in 1862, where he patented the article here and tried to introduce it.

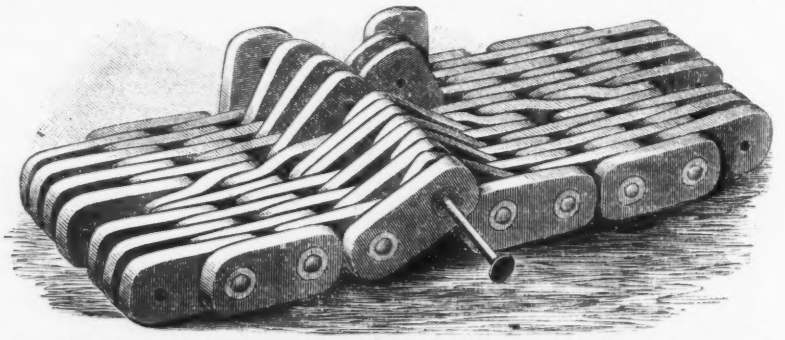


FIG. 4.—LINK LEATHER BELTING, SHOWING AMERICAN JOINT.

Fig. 1.

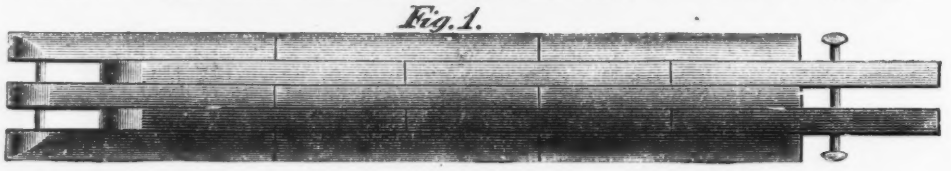
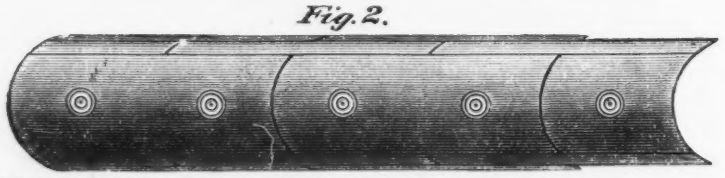


Fig. 3.

Fig. 2.



SOLID ROUND LINK LEATHER BELTING.

Several other patents have since then been taken out, and though most of these were unsuccessful in some particulars, yet the principle was deemed important, and it appears that the difficulties met with have now been overcome by certain improvements introduced by Messrs. Chas. A. Schieren & Co., of this city.

It is of vital importance that only the best and most solid leather be used in making the links; second, the leather must be made very pliable, but at the same time its toughness and tenacity must not be injured, or it will stretch and break.

In manufacturing this belt, the joining together is important. The links must be accurately assorted as to thickness, and the outer links countersunk to admit the bolt. Perhaps the most valuable improvement yet made is the "American Joint," shown in Fig. 1. This gives a perfect unbroken surface of the entire width of belt, whereas the English hinge joint makes two half widths, and whenever a sudden change of power occurs, and the belt runs half way off the pulley, it is liable to catch at the edge and tear things.

Messrs. Schieren & Co. also make a round solid leather link belt made as shown in the accompanying illustrations.

The link leather belt is easily and quickly put together or taken apart, shortened or lengthened. They are said to be about twice as strong as double flat leather belts, and weigh per square foot, 1 inch thick, about 5 pounds per foot; ¾ inch thick, 4 pounds per foot.

These belts are very extensively used in England. They are better adapted to slow running machinery than for high speeds, and as compared with flat belts to do the same work are no more expensive than those. By waterproofing the leather the links can be made waterproof, so that the belt may be used even in wet places.

The claims made for this belt are sufficient to attract the attention of those who need extra strong, durable, and effective leather belts.

THE STATUS OF BIMETALLISM IN EUROPE.

The President has transmitted to Congress the report of Edward Atkinson, of Massachusetts, who, he says, "was specially designated by me under the provisions of successive acts of Congress to visit the financial centers of Europe in order to ascertain the feasibility of establishing by international standard a fixity of ratio between the two precious metals in free coinage of both.

Mr. Atkinson summarizes the results of his inquiries under four heads as follows:

First—There is no prospect of any change in the present monetary system of European states which can modify or influence the financial policy of the United States at the present time.

Second—There are no indications of any change in the policy of the financial authorities of the several states visited by me which warrant any expectation that the subject of a bimetallic treaty for a common legal tender, coupled with the free coinage of silver, will be seriously considered at the present time by them.

Third—There is no indication that the subject of bimetallism has received any intelligent or serious consideration outside of a small circle in each country named, as a probable or possible remedy for the existing causes of alleged depression in trade.

Fourth—There is no considerable politically organized body of influential persons in either country with whom a combination could be made, if such a combination or co-operation were desirable on the part of a similar body in the United States, for promoting any definite or practicable measures of legislation to bring about the adoption of the bi-metallic theory according to the commonly accepted meaning of that term. The discussion is as yet almost wholly personal, and without concentration of purpose or the presentation of any well devised measure capable of being acted upon.

Mr. Atkinson's most important conclusion from his observations is that it would be unwise and inexpedient for the United States again to take the initiative in promoting action for a general adoption of a bi-metallic legal tender coupled with the free coinage of silver, for the reason that such action is misconstrued, and may tend to retard rather than to promote the object aimed at.

Loss of Power on Cable Roads.—According to a recent test made on the Chicago City Railway, it was ascertained that about 36 per cent of the gross power used in running that road was required to move the empty cable. Figures were made on a day of heavy traffic, and were as follows: 1022 horse-power were used to move 300 cars, only 360 of which was required to draw the empty cable. The cars were heavily loaded, perhaps 20 per cent more than usual, and Secretary Windsor, to whom we are indebted for these facts, assures us that the amount of power required to haul the cable will not exceed 40 per cent on the average.

Articles Found in an Etruscan Tomb.—A fine glass vase, just discovered in an Etruscan tomb at Bolonga, is of a sea-green color, like a soda water bottle, thick and of a unique form, with two handles. It is nine inches high and without ornamentation. There is not a single defect, flaw, crack, or chip about it. With it was found an ivory chair, made after the fashion of a modern camp stool, having all its screws and rivets still in perfect condition, and a small casket containing beads and some very elegant articles in bronze. The articles are supposed to date from the fifth century. The tomb in which they were found was closed at the top by an enormous globular mass of stone as fresh as if it had only been fashioned yesterday.

The Time in Which to do Mine Assessment Work.—Owners of unpatented mining claims, located prior to January 1st of the current year, are reminded that only a few days remain in which to perform the annual holding work of $100 required by the United States mining laws to keep their title perfect. On claims located on or after January 1st, of any year, the locator has until the first day of the second January following wherein to perform the required $100 worth of annual labor. Thus: on a claim located January 1st, 1887, the locator has until January 1st, 1889, wherein to perform the first annual holding work, which must be performed annually thereafter until the ground is patented, or it will be subject to relocation. A late ruling of the United States Land Commissioner provides that in cases where the owner of a mining claim is still prosecuting the work required annually by law on January 1st, of any year, such ground is not relocatable if $100 worth of labor is performed within the year. To guard against all possibilities of a legal contest over the title to unpatented mining ground, locators should in all cases, when practicable, perform the annual holding work between December 1st and 31st of each year.

The Hampton & Facer Process of Casting Small Steel Ingots — The chief features of this process are that the ordinary processes of "cogging" and "billeting" are entirely avoided, and claimed that a saving of at least 7s. 6d. per ton in the manufacture of steel could be effected. The advantages to be derived by using the above system were in the production of sound ingots of steel down to 2½ inches square, or in flat slabs down to 12 inches by 2 inches, made by the Bessemer, Siemens-Martin, or Clapp-Griffith processes. A parallel split or divided mold was used, the ingots were cast in groups, and a heavy iron plate-cover was securely fastened on the top of the molds. Under the lower surface of this cover a light iron frame was fitted, with baked fire-clay gutters in sections arranged to connect centrally with the molds. In the center of the iron cover was an opening, permitting a funnel-shaped "head" or reservoir to be fitted, into which the molten metal was poured, and from thence conveyed by the fire-clay runners to the respective molds, where it was delivered centrally, thereby preventing the steel from striking and cutting the sides of the molds, and without ebullition therein, whilst the metal was evenly distributed in the entire group. The head of metal above the runners gave compression to the top of the ingots, thus, it is claimed, practically avoiding blow-holes at that point.

Brazilian Laws as Affecting Foreign Engineers.—The following paragraph is quoted from a pamphlet upon the Railways of Brazil recently published by Dr. John C. Branner:

"It will interest engineers who may seek employment under the Brazilian Government to know that a law passed in 1880 requires that all engineers, geographers, and land surveyors, employed upon commissions under the government, shall present their diplomas of graduation. The diplomas of foreign universities and of 'official' schools are received as equivalents of those of the Escola Polytechnica—the Brazilian school of technology. The diploma or certificate of membership of the London Institute of Civil Engineers is also accepted. The government has been asked to define 'official' as used in connection with foreign institutions of learning, and the director of the Escola Polytechnica has been requested to furnish a list of them, but as far as I am able to learn, no such list has as yet been published. This list, however, will, without doubt, include all the *bona fide* colleges, universities and technical schools in this country."

In a communication recently made by the Brazilian Minister of Empire to the President of the Province of Minas Geraes it is declared that mining engineers shall "enjoy all the rights and privileges" of civil engineers in that Empire.

The Use of Sodium Amalgam in the Battery.—Mr. J. Remfrey, E.M., Manager of the North State Copper and Gold Mining Company, whose mines are at High Point, N. C., has been using Riotte's electric sodium amalgam and writes: "I am much pleased with the result of the sodium amalgam used, according to instructions, during a two months run. For the first two weeks I ran two batteries side by side on same ore, going to some trouble to have the ore equally mixed and divided. The result was so pronounced that after the second week both batteries were supplied with sodium amalgam and I shall continue its use right along."

Mr. E. N. Riotte's instructions were as follows: "Run your two batteries side by side from the same ore pile, feed your quicksilver into one battery, carefully cleaned in the ordinary way. Into the other battery feed your quicksilver prepared as I will explain to you. Give the amalgamator the quicksilver he is to use on his shift dry in a glass bottle, with ground in stopper, adding a piece of electric sodium amalgam not larger than the size of a pea, shake the bottle and let him feed without further preparation.

"If you can not run your batteries as above indicated run two weeks using half the ore coming from the mine and run the next two weeks on the other half of the ore, changing only the method of applying the quicksilver."

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]

Standards of Length and Their Practical Application. A Résumé Covering the Methods Employed for the Production of Standard Gauges. Edited by George M. Bond, M.E., with reports by Prof. W. A. Rogers, and the Special Committee appointed by the Franklin Institute, Philadelphia, April, 1864. Published by the Pratt & Whitney Company, Hartford, Conn., 1887. Pages 180 and Index. Illustrated.

Directory to the Iron and Steel Works of the United States (corrected to November, 1887). By James M. S. Swank. Published by the American Iron and Steel Association, Philadelphia, Pa., 1887. Pages 243 and Index. Price $3.

This is an invaluable book of reference, being a complete guide to the iron and steel works of the country. It is admirably arranged, and evidences Mr. Swank's usual painstaking and intelligent work.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED DECEMBER 20TH, 1887.

374,921. Blasting Powder. George Autheunis, Ghent, Belgium. Assignor to Max Polachek, Chicago, Ill.
374,938. Brick Machine. Charles L. Carman, Chicago, Ill.
374,942. Coke Oven Door. John J. Davis, Tioga, Pa.
374,968. Gas or Gasoline Engine. Benjamin F. Kadel, Rock Falls, Ill.
374,969. Combined Tube Cutter and Ratchet Drill. Otto Kalkhoff, Carrollton, Ill., Assignor of one half to Leverett W. Loomis, George W. Ross and Chas. E. Underwood, all of same place.
374,975. Automatic Locomotive Injector. Franklin W. Kramer, Wadsworth, O., Assignor to the Garfield Injector Company, same place.
374,977. Lubricator. S. Park Lathrop, Montclair, N. J.
374,979. Lubricating Oil Cup. S. Park Lathrop, Montclair, N. J.
374,999. Furnace. Andrew Ritter, Jr., Chicago, Ill.
375,002. Furnace. Luke Ryan, Apollo, Pa., Assignor to himself, A. S. Gourlay and Samuel B. McElroy, same place, and Philip H. Laufman, Allegheny, Pa.
375,021. Apparatus for Irrigating Purposes. John Thompson, Brooklyn, N. Y.
375,022. Method of Electric Welding. Elihu Thomson, Lynn, Mass.
375,023. Disk Water Meter. John Thomson and Frank Lambert, Brooklyn, N. Y., said Lambert Assignor to said Thomson.
375,034. Carbon Electrode for Galvanic Batteries. Chas. H. Wilder, Natick, Mass., Assignor to the Hub Carbon Co., Kennebunk, Me.
375,043. Manufacture of Metallic Tubes. John L. Bogert, Flushing, N. Y.
375,050. Mode of Reducing the Ends of Pipes. Eugene O. Daniels, Springfield, O.
375,067. Cut-off Valve. James A. Horton, Reading, Mass.
375,085. Gas Retort Furnace. George A. McIlhenny, Washington, D. C.
375,086. Steam Engine Indicator. Albert C. Meady, Somerville, Assignor to the Crosby Steam Gage and Valve Co., Boston, Mass.
375,090. Cut-off Valve. Otto Noll, Berlin, Germany, Assignor to Paul Brennicke & Co., same place.
375,161. Apparatus for Making Fuel Gas. Arthur C. Huidekoper and Luc Houze, Meadville, Pa.
375,165. Water Ball Breaker for Oil Mills. William Krutzsch, Dayton, Ohio, Assignor to the Buckeye Iron and Brass Works, same place.
375,198. Splice Bar for Railroad Rails. Jonas Potter, Morrellville, Assignor to himself and Jacob Strayer, Johnstown, Pa.
375,199. Crushing Mill. Alpheus E. Roe, San Francisco, Cal., Assignor to Tatum & Bowen, same place.
375,200. Water Engine. George Ross and William Ross, Troy, N. Y.
375,203. Automatic Catch for Inclined Railways. Josef Schuller, Allegheny City, Pa.
375,209. Nail Making and Distributing Machine. Chester C. Small, Assignor to Freeborn F. Raymond, 2d, Newton, Mass.
375,211. Zinc Casting Machine. Joseph J. Smith, Jamaica, and Chas. A. Janson, New York, N. Y.
375,212. Amalgamating Pan. August Soderling, Bodie, Cal.
375,236. Apparatus for Carbonizing Cement Pipes, etc. John H. Walsh, Boston, Mass.
375,248. Tube Expander. Jabez K. Babcock and Josiah P. Champion, Phelps, N. Y.
375,253. Pipe Coupling. John Bersch, Kingston, Pa.
375,258. Metallic Packing. William R. Brockett and Frederick G. Brockett, Park City, Utah.
375,259. Tube Expander. Josiah P. Champion, Phelps, N. Y.
375,262. Coal-Drilling Machine. Amaziah Covey and Samuel J. Covey, Sigourney, Ia.
375,282. Steam Boiler. Oliver H. Gentry, Opelousa, La., Assignor of one half to Joseph Block, same place.
375,302. Machine for Making Cut Nails. David C. Sweet, Cummings, and Frank Allison, Grand Crossing, Assignors to the Sweet & Allison Manufacturing Company, Chicago, Ill.
375,310. Lubricator. George W. Bartlett, Clifton Forge, Va.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(*Continued from page* 453.)

Actual experience seems to fully bear out the results of these experiments, and it is considered very important to remove the scale from the plates of iron ships, and to that end they are sometimes pickled.

D. *Copper, Brass, etc.* As copper is electro-negative to iron, and as tin is still more so, while zinc is electro-positive, so we find that while the contact of zinc and of the most zinciferous brasses retards rusting, that of copper and of the common brasses rich in copper hastens, it the brasses very rich in copper being apparently as injurious as copper itself; that of the bronzes (copper-tin alloys) hastens it still more, and that of pure tin more yet. Mallet found that a brass consisting of 75% of zinc and 25% of copper protected cast-iron from corrosion as well as pure zinc, while it was not so rapidly corroded itself as zinc is: whence he inferred that it would form a more permanent protection than zinc. He found that during an immersion of from 15 to 66 days in pure sea water, the corrosion of cast-iron was increased by galvanic contact as follows:

Brasses containing less than 31% of copper *retard* corrosion.	
Copper and brasses containing 31% of copper or more increase corrosion by	10 to 61%
Bronzes increase rusting by	62 to 237%
Tin increases rusting by	364%

E. *Iron on Iron.* As there is a decided difference of potential between different sorts of irons, so their mutual contact hastens the corrosion of the more electro-positive while retarding that of the more electro-negative. Thus, immersing similar blocks of very hard dense bright gray and of soft "highly carbonaceous" dark gray cast-iron for 25 months in jars of confined sea water, A separately, and B with the hard in galvanic contact with the soft, Mallet found that the average depth of removal of metal by corrosion was as follows:

Depth of corrosion on simple immersion	hard iron ·007″	soft iron ·01″
Depth of corrosion when immersed in mutual contact	·00263″	·03″

The net effect of the contact is to greatly increase corrosion, as the soft iron now loses nearly twice as much as both together lost when separately immersed.

§ 168. PROTECTIVE COATINGS, ETC.—Finding no data as to the relative protection against rusting afforded by galvanizing, tinning, barffing, etc., I have begun some experiments to fill the gap. Their final results will appear in an appendix; those obtained shortly after immersion follow. In comparing these protective coatings, two chief points are to be considered, the thoroughness and permanence with which they exclude air and moisture, and thus mechanically prevent oxidation, and their galvanic effect. Thus, while a coating of tin or of magnetic oxide, being electro-negative to iron, hastens, while one of zinc retards the corrosion of unprotected portions, yet the former may be so much more impervious and enduring than the latter that their mechanical advantage may outweigh their galvanic disadvantage. As far as my inquiries have gone, workers of tinned and zinced iron consider zincing as a much better and more enduring protection than tinning: and my results agree to a certain extent with their belief. Of the twenty-three galvanized pieces tested, fifteen of which were sheared from sheets of galvanized iron, and therefore had no zinc on their edges, one only showed rust, after an exposure of from 16 to 18 days: the edges of all the sheared pieces, even of those in sea water, remaining perfectly bright after 18 days immersion. All of the fifteen sheared tin pieces, including those in distilled water, had rusted at the end of 24 hours: while all the unsheared pieces, *i. e.* those which were completely covered with tin, had rusted after 17 hours immersion when in sea water, and after 8 days when in Cochituate water.

But when we come to the actual loss of weight (Lines 9 to 11, Table 47 F) we find little difference between the galvanized and tinned pieces. The very considerable loss of weight which the galvanized pieces undergo in Cochituate and distilled water, indicate that a considerable proportion of their zinc is pretty rapidly removed. As with its removal the conditions must change greatly, longer exposures are needed before we can decide as to the relative protection afforded by zinc and tin.

During the brief immersions of my experiments the other classes of iron rusted much more than either galvanized or tinned iron: whether the same will hold true in all cases after prolonged immersion remains to be seen. While to judge by the eye bright iron appears to rust much more rapidly than the others, becoming completely or nearly completely covered with rust in about twelve hours, though a large part of the surface of the Russia and black irons remained free from rust after 18 days, yet the actual loss of weight by corrosion does not differ very greatly among these three classes; the black iron on the whole corrodes somewhat faster than the bright and the Russia.

Judging from the proportion of surface covered with rust, the barffed iron appears on the whole to resist rusting better than any of the others, excepting the galvanized and the tinned. Though I cannot state confidently that the barffed iron corroded less rapidly than the Russia

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TABLE 47 F.—CORROSION OF GALVANIZED AND TINNED IRON, ETC.

	Simple immersion in.	Thin sheet iron.					Barffed lumps.	Tinned nails.	Galvanized staples.	Blued screws.	Nickeled screws.
		Galvanized.	Tinned.	Russia.	Block.	Bright.					
Length of time immersed when rusting was first observed.	Sea water.	.....	25·5 hrs.	5·5 hrs.	0 67 hrs.	3·25 hrs.	4·5 hrs.	17 hrs.	16 days.	.....	17 hrs.
	Cochituate (Boston) water.	.....	25·5 hrs.	7·67 hrs.	3·25 hrs.	1 hr.	16·5 hrs.	46 hrs.	.....	.....	16·5 hrs.
	Distilled water.	.....	24 hrs.	1 hr.	1 hr.	1 hr.	.....	.....	.....	1·5 hrs.	1·5 (?) hrs.
Percentage of upper surface covered with rust after 18 days	Sea water.	All perfectly bright, incl'd-ing edges.	4	27	10	100·	.....	.....	.....	.....	.....
	Cochituate.		3	20	62	99·5	.....	.....	.....	.....	.....
	Distilled.		5	14	27	100·	.....	.....	.....	.....	.....
Appearance after 16 days immersion	Sea.	.....	.....	.....	.....	.....	Much tubercular rust.	Ends badly rusted.	Almost perfectly clean.	.....	Heads completely covered with rust, or nearly so.
	Cochituate.	.....	.....	.....	.....	.....	Tubercular rusting.	Slightly spotted.	Perfectly clean.	.....	Heads much rusted.
Loss of weight, lbs. per sq. ft. of surface per annum	Sea water.	0·00013	0·080	0·136	0·128	0·143	.....	.....	.....	.....	.....
	Cochituate water.	0·062	0·042	0·143	0 275	0·177	.....	.....	.....	.....	.....
	Distilled water.	0 044	0·050	0·128	0·187	0·199	.....	.....	.....	.....	.....

The pieces were in all cases immersed in confined water, in shallow, open porcelain vessels, the water standing about ·37 inch above the iron, and the loss by evaporation being compensated for by adding distilled water, usually every alternate day. The different pieces did not touch each other.

THIN SHEET IRON.—In each of the three menstrua five pieces each of galvanized, tinned and Russia iron, four or five of black iron, and two of bright sheet iron, each 0·5 inches square, were immersed.

OTHER PIECES.—Four galvanized iron staples, 4 and 5 tinned nails, 4 and 9 barffed lumps, and 4 nickeled screws were immersed in "Cochituate" and in sea water: and 3 nickeled and 3 blued screws in distilled water.

Cochituate water is Boston city water.

Previous to immersion the pieces were simply wiped clean.

The pieces of sheet-iron lay horizontally, or nearly so, and were raised above the bottom of the vessel by thin wooden strips. In nearly every case the upper side of these pieces rusted very much more than the under side.

in sea water, in Cochituate water the difference was marked, the Russia iron always showing signs of rust in from one to eight hours after immersion, while of the barffed pieces one began to rust after 16·5 hours, another after 47 hours, and the other two were free from rust after 16 days immersion.

The few pieces of blued iron experimented on rusted with extraordinary rapidity, becoming about one-third covered with rust in 8·5 hours, even in distilled water.

The nickeled pieces also rusted very rapidly, but the rusting appeared to be confined to certain spots: and, in several cases after a nickeled piece had become much rusted, on removing the rust with a cloth and rubbing the piece I was unable to discover with the naked eye the spot at which the rust had formed.

The barffed pieces undergo tubercular rusting, the corrosion being confined to certain spots, at which the rust piles itself up in little knobs. The tinned pieces also occasionally developed tubercles of rust, but to a much less marked degree.

CHAPTER X.

NITROGEN, HYDROGEN, CARBONIC OXIDE.

§ 170. CONDITION OF THESE SUBSTANCES IN IRON.—They may exist in three if not four fairly distinct conditions: (1) in chemical combination of the ordinary type: (2) in solution: (3) in adhesion: (4) mechanically retained in pores which are at least microscopically visible, and hence set free when the metal is comminuted. In the first three conditions these substances are distinctly no more gaseous than water and ice are: in the fourth they are gaseous.

Some of these terms are vague enough: in this classification I purposely avoid the still more equivocal ones alloying and occlusion: alloying is included under the first three conditions, but occlusion may be held to imply any of the four or a combination of any or all of them.

The first condition may be exemplified by the oxygen of iron oxide in minute particles dissolved or suspended in solid iron, or of cuprous oxide in molten copper: the second by hydrogen or sulphur apparently united with the whole of the mass of molten iron which contains it: the third, in which physical probably greatly preponderates over chemical force, by the oxygen and nitrogen condensed on the surface of glass tubes, from which barometer makers remove them with the greatest difficulty, or by ammonia or carbonic acid absorbed by charcoal: the fourth by bubbles of air in ice, or of carbonic acid escaping from champagne. For many readers the first three classes are resolvable into two: for many of us either hold that solutions differ only in degree from typical chemical unions, or maintain that solution and adhesion are one. I will not even assert that I have in the foregoing examples correctly stated the conditions of the elements. We can as yet rarely if ever fully discriminate, in the case of nitrogen, hydrogen, etc., in iron, between these first three conditions: for our purposes they may be regarded as a single group, the non-gaseous or condensed state, clearly distinguished from the fourth or gaseous condition.

We must free ourselves from the popular misconception that these substances can only exist either in chemical union of the common type, *i. e.* in definite ratio, or as gas. The case of charcoal, which at atmospheric pressure absorbs as much as 90 times its own volume of ammonia, may assist us. In view of the similar retention of gases by glass, we safely hold that the charcoal and ammonia are not in chemical union of the ordinary type: nor is the ammonia present as a gas, for in this case its pressure should burst the charcoal. So too electro-deposited iron may hold 248 times its own volume of hydrogen, about half of which escapes when the metal is exposed to the air at the ordinary temperature. Palladium absorbs 980 times its own volume of hydrogen, whose density is thought to be thereby increased about 10,000 times, so that it doubtless exists either as a liquid or solid.

While we readily understand how solid or even pasty iron may mechanically retain a very considerable quantity of hydrogen, nitrogen, etc., in the gaseous condition, it is almost inconceivable that molten iron should hold an important quantity. Ice may be as spongy as you please, but water can retain but few and minute gas bubbles.

These substances pass back and forth, from the condition of a gas mechanically held in blowholes to the non-gaseous condition of adhesion, so readily that, while the two conditions are very unlike, it is extremely difficult in the case of gas present in solid iron to decide how much exists in each state. If we would collect the mechanically held hydrogen by exhausting the metal, part of that in adhesion probably becomes gasified the instant that the pressure of the initially gaseous portion begins to decline. Nay, even the mechanical action of the drill with which we seek the larger cavities may gasify part of the hydrogen in adhesion. And, if there be a real difference of kind between adhesion and solution, hydrogen probably slides back and forth between these states also on slight provocation.

We readily see how hydrogen, nitrogen, etc., in chemical combination or solution may affect the properties of iron: we may also conceive that, when in adhesion, they may have a powerful influence, owing to the ease with which they become gasified. If as is probable, the metal contains numberless microscopic or even intermolecular pores, when we distort it we change their size. Part of the hydrogen in adhesion may be supposed to gasify and rush into those which we thus temporarily enlarge, as fast as this enlargement lowers the pressure of the gas already in them. This increased quantity of gas may subsequently oppose our effort to return the metal to its initial shape, and perhaps the more powerfully the larger the quantity of hydrogen in adhesion. The ·01% of hydrogen often present in iron might in this way influence its properties greatly, more perhaps than if in chemical combination; for, if gasified, its volume would be ten times that of the steel at atmospheric pressure. This is not brought forward as the actual condition of things, but merely as an illustration of the way in which hydrogen, nitrogen, etc., in adhesion might be conceived to act, and as showing that it is conceivable that they might influence the properties of iron without being chemically combined with it. A possible example will be presented in § 178.

But a given weight of hydrogen, etc., probably produces by far the most severe effects when it passes from the condensed to the gaseous state while the metal is plastic. Unable to free itself it collects, producing cavities or blowholes: if these occupy but one-twentieth of the volume of the metal they may make it perfectly useless; yet they could be caused by gas which formed but 0·00005% of the metal by weight, or one part in 2,000,000. We can hardly believe that so minute a quantity in chemical combination could sensibly affect the properties of the metal.

(TO BE CONTINUED.)

CORRECTION.—Issue of Dec. 17, 1887, p. 452, second column, seventh line from bottom, *omit* the sentence beginning "The difference of potential," etc.

PERSONALS.

Mr. Richard E. Chisin, mining engineer, has opened an office in the City of Mexico, Mex.

Mr. J. E. Hendry, the editor of the *Independent*, at Helena, Montana, died at that place last week.

Mr. C. H. Aaron, mining engineer, has returned from Central America, where he had gone on professional business, and is now in San Francisco.

Mr. J. J. Lawrence, President of the Pittsburg & Chicago Gas Coal Company since its organization, has resigned on account of ill health, and Mr. John Pitcairn, Jr., has been elected President.

Dr. Ferdinand Vandeveer Hayden, the well-known geologist and explorer and formerly director of the Geolgical Survey of the United States, died at his residence at Philadelphia, Pa., on the 22d inst., aged 57 years.

The health of Mr. T. V. Powderly, General Master Workman of the order of the Knights of Labor, is much improved, and it is his intention to make arrangements to speak at all the places where he was compelled to cancel his engagements when he was taken ill.

Mr. Robert Billings, the purchasing agent of the Puebelo Smelting Company, Pueblo, Colorado, has resigned his position. Mr. Billings has been connected with the company for several years. Mr. Ed. Billings, of the Miners' Sampling Works of Georgetown, has been appointed the general purchasing agent.

Mr. Thomas White, mining engineer, of Deadwood Dakota, is examining the Kansas Chief mine, situated in Mount of Holy Cross mining district for the South Gold Park Mining Company (Limited), of London, England. From Colorado Mr. White goes to California to examine some quicksilver properties for other English companies.

Mr. John H. Wells has been elected treasurer and Mr. John M. Evans secretary of the Youngstown Rolling Mill Company, Youngstown, Ohio. These gentlemen will together manage the business. This action was taken in view of the resignation of Mr. Henry Wick, who was secretary, treasurer and general manager. Mr. Wick will take charge of the Alderice, Bishop & Co. mill, at Warren, under an arrangement with the creditors.

FURNACE, MILL, AND FACTORY.

It is reported that the Hudson River Iron and Ore Company is to build two new blast-furnaces at Burden, N. Y.

The Columbus Warm Air Furnace Company building, at Columbus, Ohio, was destroyed by fire on the 20th inst.

The Magnetic Iron Mines Company, it is stated, will build shortly two new furnaces two miles south of Brewsters, N. Y.

The Dowling Blast-Furnace Company is making preparations to erect a 125-ton blast-furnace near Chattanooga, Tenn. The company has a capital stock of $200,000.

The Kittanning Iron Company, Limited, at Kittanning, Pa., which has been closed down for several weeks owing to a strike of the men, resumed operations in all departments on the 16th inst.

It is stated that a rolling-mill is to be erected at Riverside, Los Angeles County, Cal. The projectors control iron-ore lands within two miles of Daggett, from which to supply the material to be worked.

The South Atlantic & Ohio Railroad, in which the ristol Land and Improvement Company, of Bristol, Tenn., is erected, has a standing subscription of $110,000 to the first 100-ton furnace erected in Bristol.

Messrs. Edward P. Allis & Co., of Milwaukee, Wis., are now putting up at the works of the Sloss Iron and Steel Company, Birmingham, Ala., a Reynolds-Corliss engine, which is said will be one of the largest and finest blowing engines in the South.

The converting, blooming and rail departments of the Edgar Thomson Steel Works, at Braddock, Pa., were closed down on the 17th inst. It is understood that the rail-mill suspension is for an indefinite period, but that the converting and blooming departments will resume after the annual repairs have been made.

Adam Wagner, assignee, sold on the 17th inst., by order of court, the Swifts Iron and Steel Works, in Newport, Ky. The real estate, machinery, material and stock sold for $199,350. It was bought by H. A. Shriver, who is said to represent a company composed of Al. Gehr, Adam Wagner, R. W. Nelson and others.

The Tallapoosa Furnace Company has been organized at Tallapoosa, Ga., with a capital stock of $100,000. The officers are: O. W. Bullock, of Springfield, Mass., President; Jas. A. Burns, Atlanta, Ga., Vice-President and General Manager; D. Carleton, Hartford, Conn., Treasurer, and I. J. McRonald, Tallapoosa Ga., Secretary. It is proposed to begin work on the furnace at once.

Suit has been begun against the Trumbull Iron Company, Youngstown, Ohio, by C. B. Sill and Henry E. Black for $5600. The plaintiffs allege that the defendant refused to accept a mill for making iron shafting and round iron after it had been delivered and the contract price, $600, demanded. They also claim that the defendant refused to carry out a contract to purchase for $5000 a share of the patent right covering the mill.

The American Institute, at their Fifty-sixth National Industrial Exhibition, now open, have given the medal of "superiority" to Tri-Sodium-Phosphate—the water purifier exhibited by Messrs. Wilson & Roake, the New York agents of the Keystone Chemical Company, of Philadelphia, being the highest award of that society. The judges state in regard to it, that "This exhibit is a tribasic phosphate of soda. It unites with the mineral acids in combination in boiling water, not only breaking up the scale-producing salts, but converting them into insoluble non-corrosive precipitates readily eliminated. It is not simply a solvent for scales but direct chemical action converts them into inert and esily removable bodies. It is also free from injurious action. The medal of superiority awarded."

CONTRACTING NOTES.

Contracts Open will be found on page xix. New contracts this week: No. 683, Water-Works; No. 684, Water-Works; No. 685, Water-Works; No. 686, Water-Works; No. 687, Boring an Artesian Well; No. 688, Welded Steel Boilers; No. 689, Bridge Construction; No. 690, Bridge Construction; No. 691, Iron Pipe and Castings; No. 692, Cast-Iron Water Pipe and Special Castings.

The Salem Iron-Works, Salem, N. C., desire to correspond with manufacturers of wood-working and iron-working machinery.

Mr. W. L. Whitaker, Texarkana, Texas, is about to contract for the builing of gas-works, with about five miles of main to be laid, and wishes to enter into correspondence with contractors.

The Atlanta Talc and Soapstone Mining and Manufacturing Company, Atlanta, Ga., is about to contract for a mill that will grind talc into perfect floats, and desires to correspond with manufacturers.

Information as to the cost of a 20-stamp mill (4 batteries, 5 stamps each), for wet crushing, with shaft large enough to accommodate 20 additional stamps, is desired by Otto C. Scapin, M.E., Dawsonville, Ga.

The Union Iron Works Company, at Chattanooga, Tenn., has received the contract for the Athens Water-Works, Athens, Tenn., comprising a system of 8-foot pipe, pumps, boiler and stand-pipe. It is the intention to erect a larger plant in the spring.

LABOR AND WAGES.

The Lackawanna Iron & Coal Company and the Scranton Steel Company, Scranton, Pa., have announced a general reduction in wages of 10 per cent, to take effect January 2d.

About a week ago delegates from the coal miners in Mercer and Butler counties, Pa., demanded an advance of ten cents per ton, which would bring them up to the Columbus scale, and asked that, in the event of the operators refusing the advance, the matter be settled by arbitration. As neither proposition has been accepted a strike will take place.

The Bethlehem Iron Company, Bethlehem, Pa., has announced a general reduction of 10 per cent in wages, to take effect January 1st. The reason assigned is that "the condition of trade and the reduced price of rails in the market made it necessary for this company to reduce the expense of manufacture." This reduction still leaves wages several per cent higher than before the advance of last winter.

The South District Miners' and Laborers' Association will hold a convention of miners of the bituminous region at Dubois, Pa., on January 4th. Action will be taken on the resolution of the Columbus convention for an advance of 5 cents per ton. Some of the Clearfield operators have resisted the advance. Sub-division No. 3, of the Knights of Labor, will meet at the same time and place, and united action will be taken to secure the advance and the enforcement of the semi-monthly payment law.

The Railroad Coal Operators' Association met in Pittsburg, Pa., on the 20th inst., and notified the officials of the Miners' Association that, unless the men working at the old rates come out for the Columbus scale, the operators now paying the 5 per cent advance will close their mines. The Master Workman of the miners was present, and promised that, if two or three days' time was given, the men at Scott's, Bigley's and the Pennsylvania Coal Company's mines would strike unless the advance was given them.

A conference of nail manufacturers, representing ten mills, near Wheeling, West Virginia, and the "feeder nailers" who took the places of the striking nailers last year, was held on the 17th inst. The manufacturers now wish a concession of still lower wages from the workmen. No result was reached except to show that the men are as firm against the reduction as the nailers were in 1886. A proposal is now being considered to disrupt the Western Nail Association, and organize a local association of the manufacturers.

The miners in the employ of the Philadelphia & Reading Railroad Company have submitted the question of their wages next year to a committee of their number, and this committee expresses the belief that the whole matter will be satisfactorily arranged and a strike averted. Interviews were had this week with representatives of the Lehigh Navigation and the Lehigh Valley and Pennsylvania Railroad companies with reference to their position in the strike, and they all asserted that it was extremely probable when work should be resumed in their mines that they would have no basis of wages, but simply pay whatever they thought the market price of coal would warrant. The Pennsylvania Railroad Company has ordered that all of its idle collieries shall not be put in operation again until next April, even though the strike shall end before that time.

GENERAL MINING NEWS.

The Milwaukee *Sentinel* states that deeds were filed at Ashland on the 15th inst., conveying the folowing iron mining properties on the Gogebic range to John H. Rice of New York City: Kakagon, $680,000; Nimikon, $489,000; Bessemer, $480,000; Moore, $200,000; Bourne, $200,000; and the Atlantic, and a number of transfers for small tracts of mineral lands as follows: Moore, Benjamin & Co. $24,700; N. D. Moore et al, $2760; G. H. Gile and wife, $7500; N. D. Moore, $8000; Laura D. Benjamin, $3200; making a total consideration for the properties of $46,160. It is understood here that Mr. Rice consummated the deal which has been pending for some time between Moore, Benjamin & Co., and the Lake Superior Iron Consolidated Company, of which Stephen A. Dorsey is President and Jesse D. Grant Secretary. It was supposed that the matter had fallen through until eleven deeds were received by the register of deeds on the above date.

MILWAUKEE & GENEVA RAILROAD COMPANY.—This company has been organized, with a capital of $1,500,000, for the purpose of building a railroad from Milwaukee to the Illinois coal-fields.

ALABAMA.

A meeting of capitalists interested in the development of the iron industry in Alabama was held in Pittsburg, Pa., on the 21st inst. There were present Robert Hogsett and Judge Ewing, of Uniontown; John Hutchinson, of New York, and W. H. Smith, the vice-president of the Louisville & Nashville Railroad. They are the principal stockholders in a wealthy corporation which already has erected furnaces in the new iron district of Alabama. The company proposes to make still further investments and has completed arrangements for establishing a new town at or near Trussville.

JEFFERSON COUNTY.

BIRMINGHAM FURNACE AND MANUFACTURING COMPANY.—This company will put up 100 coke-ovens at Trussville. Work on the same is to commence soon.

ARIZONA.

PINAL COUNTY.

J. D. REYMERT MINING COMPANY.—We are officially advised that the production for November amounted to $5080.11.

CALIFORNIA.

FRESNO COUNTY.

THE JOSEPHINE MINING COMPANY, LIMITED.—This company has been organized in London with a capital stock of £60,000, shares £1 each, for the purpose of working the Surprise and Josephine mines, which are to be purchased from the Exploration Company, Limited. This company purchased them for £25,000 from Mr. D. B. Gillette, and in addition thereto that company has provided a sum of £15,000 cash for completing the equipment of the mines and furnishing the requisite capital for the efficient working, to the full benefit of which the new company will be entitled; the portion of the £15,000 not expended on the property being handed over in cash on completion of the purchase. The Exploration Company has pushed the work of development, and a mill of twenty stamps, with chlorinaton plant, is now in process of erection. It is expected that this work will be completed before January 1st, 1888. The Exploration Company, Limited, who are now the vendors, are themselves the promotors of the present company, and as such have fixed the price to be paid for it, which is £60,000, to be received—£51,000 in cash and £9,000 in fully paid up shares. Out of this sum the vendors will pay all expenses connected with the formation of the company up to the first general allotment of shares. The other funds that will be made over to the company, representing the balance of the £15,000, will, it is considered, provide it with ample working capital. The property has been reported upon by Mr. James B. Little and Mr. Ross E. Browne, Mining Engineers. Messrs. Smith and de Crano are the managers of the Exploration Company.

LOS ANGELES COUNTY.

In boring an artesian well in Fairview, six miles from Santa Ana, natural gas was struck.

MONO COUNTY.

STANDARD CONSOLIDATED GOLD MINING COMPANY. Official advices to us show that the production for November amounted to $42,026.53. The company on December 1st had a balance on hand of $88,236.29.

CANADA.

PROVINCE OF NOVA SCOTIA.

SPRING HILL MINING COMPANY.—This company has purchased a large tract of coal land at Cow Bay, Cape Breton. Operations are in progress to sink a shaft to a depth of some 350 feet, where it will tap the coal at a point in the center of the basin where levels and cross-cuts will be entered.

COLORADO.

The office of the Surveyor-General of Colorado is the most important in the United States, from a mineral standpoint, and one of the largest in the line of general land surveys. Since November 30th, 1886, when the State of Colorado was thrown into one mineral district, instead of seven, as had been the case since 1860, there have been 590 orders for mineral surveys issued, comprising 1042 lode claims, 46 mill sites and 52 placers. Applications continue to come in very numerously, as the revival of business is general over the whole State and owners of mining claims are desirous of perfecting their titles by obtaining patents. For the amount of territory involved there are more applications from Clear Creek and Gilpin counties than from any part of the State. The vicinity of Aspen has been remarkably quiet for many months, but a renewal of confidence or some other cause has created within a few weeks a comparatively active demand for official surveys. In the immediate neighborhood of Leadville the ground is nearly all patented, so that few applications now reach the office from there, but from the adjoining camps of St. Kevins, Twin Lakes, and Tennessee Park are received constant requests. A good many official surveys have been made this year in the vicinity of Del Norte, a section which has heretofore been quiet for some years. The amount of fees received in the month of August exceeded that for any month since October, 1882, and the aggregate for the year will be the largest since 1883.

BOULDER COUNTY.

LOGAN GOLD MINES, LIMITED.—This company has been organized in London, with a capital stock of £120,000, shares £1 each, to acquire Logan, Crœsus, Quincy and Doz Crusoe mining claims, situated in Sun beam Gulch, Sugar Loaf mining district. These claims form one compact group, and have been recently examined and reported on by the following mining engineers: Mr. Ernest le Neve Foster, late State Geologist of Colorado : Mr. Milton Moss, of the Colorado State School of Mines, and Mr. Wm. M. Rule, M.E. From their reports the following statements are taken: The ore extracted from the mines during these workings has paid the entire cost of developing, including the tramways, buildings, etc., and left a profit. The lodes of the Logan group are large and well-defined, possessing all the characteristics of true fissure veins. They have been traced and opened upon from the base of the mountain, up over its side, along the summit 300 ft., then down the opposite side of the mountain, making a length of 4500 ft. upon the lode. The Logan lode has been developed by drifts, shafts, winzes. The great bulk of the ore appears to yield from 5 ounces to 10 ounces of gold and like quantities of silver per ton. The mines are about a mile by good wagon road to Crisman Station on the Greely, Salt Lake & Pacific Railroad. At Boulder and Denver are convenient markets for sale of ore and supply of all materials at reasonable prices. No expensive mining machinery is required, the ore being sold direct to the smelters. The ground is easy to work and the expense of mining is said to be low.

CLEAR CREEK COUNTY.

FLORENCE MILLING AND MINING COMPANY.—This company has purchased from James H. Platt all the properties previously owned by the Consolidated Pay-Rock and Silver Plume mining companies ; also the concentrating mill and tramway. At a meeting of the incorporators of the company, the following officers were elected : President and Treasurer, James H. Platt ; Vice-President, Fred C. Keeney ; Secretary, Fred J. Egan ; Manager, John M. S. Egan.

CUSTER COUNTY.

DICKENS CUSTER COMPANY, LIMITED.—This company has been organized in London, with a capital stock of £420,000, shares £1 each, to acquire so much of the mining and other similar rights, privileges and liberties exercisable over lands in the Yankee Fork mining district, by purchase from the directors of the Charles Dickens Mining Company, Limited, on terms which have been agreed upon (or with such modifications as may be deemed desirable) as in the agreement to be made between the Charles Dickens Mining Company, Limited, acting by Cecil Thomas Gladstone and Gerrard van de Linde, the liquidators appointed, as therein recited, of the Charles Dickens Mining Company, Limited, of the one part and the Dickens Custer Company, Limited, of the other part.

GUNNISON COUNTY.

OHIO CREEK ANTHRACITE COAL COMPANY.—Acting Secretary Muldrow, of the Department of the Interior, Washington, D. C., has requested the Attorney-General to direct that criminal proceedings be instituted against the Ohio Creek Anthracite Coal Company, of Mount Carbon, Colo., for willful trespass in causing James Le Counts, of Gunnison, to cut 3000 railroad ties from unsurveyed non-mineral lands. These ties were cut under contract with the company, which subsequently refused to accept them and have been taken possession of by the government and ordered sold. The Secretary says the company had a guilty knowledge of and abetted the trespass.

PITKIN COUNTY.

CONNEMARA.—A strike of a body of high grade ore is reported. The main shaft is down between 600 and 700 feet, and a great deal of work has been done.

SAN JUAN COUNTY.

YANKEE GIRL MINING COMPANY.—The annual meeting of this company was held in Pittsburg recenly The report presented showed earnings aggregating something in excess of $350,000, and dividends paid amounting to over $162,000, and a large sum invested in betterments. The old board of directors, consisting of James McKay, W. J. Hammond, Charles Lockhart, George Crawford and Wm. H. McKelvey, were elected.

DAKOTA.

Forty tons of tin ore from the Black Hills have been shipped to England from New York this week by the Wilson Steamship line.

BEADLE COUNTY.

HURON COAL COMPANY.—A complete reorganization of this company has been effected by the election of John A. Kemp, President; H. J. Rice, Vice-President; H. S. Brown, Secretary and Treasurer; James Russell, Superintendent. The company is now at work sinking a shaft on its property at Huron.

LAWRENCE COUNTY.

DEADWOOD-TERRA MINING COMPANY.—The company has passed the dividend for December, owing to the purchase of its supplies for the winter, which necessitated an expenditure of $90,000. It is stated that the payment of dividends will shortly be resumed. The prospects at the mine are said to be good, and two hundred stamps are dropping on good ore at present.

GEORGIA.

PICKENS COUNTY.

FRANZESKA MINING COMPANY.—This company has been organized with a capital stock of $100,000, to develop other mines in Pickens County, by J. A. Walker, B. H. Crawford and Kristian Kortgaurd. Machinery has been purchased, and mills will be erected near Talking Rock, with a daily capacity of 20 tons.

INDIANA.

DUBOIS COUNTY.

BUCK SHOALS SILVER MINING COMPANY.—It is reported that this company has started work at its mines on the White River, ten miles northeast of Jasper.

GRANT COUNTY.

Oil was struck at Marion, on the 19th inst., while boring for natural gas.

IOWA.

Mine Inspector Smith, of Iowa, proposes a penalty of not less than $2000 to $5000 for every case where the miners are coerced into buying of a company store against their inclination. He says: "Supply stores are needed and are a benefit to the miners, and it would work a great hardship if mine owners were not permitted to run such stores or to allow the miners credit and keep the amount out of their wages. Many miners, I am sorry to say, have not the means to carry their families a single day or to purchase tools with which to work, and to these supply stores are a blessing. A long experience has taught me that human beings are no more honest than they can afford to be, and while I am now and forever the friend of the miner, I must say that in every mining camp a large proportion of the population is ready and eager for an opportunity to beat somebody. This class the ordinary merchant can not trust, and only the supply store with its hold an the wages can take the risk."

MEXICO.

The Mexican *Financier* reports the following:

The Department of Public Works has entered into a contract with Mr. Rosendo Fernandez for the exploration and working of mines of all kinds in the mineral districts of Miquihuana and Bustamante, in the State of Tamaulipas. The concessionaire is authorized to do this work by himself or by a company which he may organize. Exploration must be commenced within three months from the publication of the contract, and must be finished within six months, when a detailed report of what has been found must be presented to the Department of Public Works. Mining operations must be commenced within five months from taking possession of properties, which are to be denounced under the Mining Code. Within five years from beginning this work the company must invest in tools, offices, railways, etc., $250,000, and three fourths of all the ore extracted must be reduced in Mexico, and within five years the company must build its own reduction works.

The imports of Mexican copper at Liverpool for the first ten months of this year were 53 tons, and in the same period in other years as follows: 1886, 166 tons; 1885, 365 tons; 1884, 291 tons; 1883, 467 tons; 1882, 322 tons.

MEXICAN MINING COMPANY.—The superintendent's report, presented at the annual meeting of this company, held at San Francisco recently, shows that at the date of the last annual report a north drift had just been started from the Ophir shaft by this company jointly with the Union Consolidated Company, to penetrate and explore the 1300-foot levels of the Mexican and Union Consolidated mines. On December 31st following, this joint drift entered Mexican ground. The course of the drift was then turned in a northeasterly direction, to follow the trend of the vein, and was extended through the Mexican ground to its north line, having passed through Ophir ground 243 feet, and through Mexican ground 801 feet, making the whole length of the drift from the Ophir shaft to the northern boundary line of this company's mine 1044 feet. On January 21st, an east cross-cut was started by this company jointly with the Ophir Company from the north drift on the line dividing the two mines, and has been advanced for a distance of 643 feet. The formation passed through by a portion of this cross-cut is of soft vein porphyry, with clay separations and streaks of quartz which carry some value. On the 12th of August, from the end of the above-mentioned joint east cross-cut, a drift was started to run in a northerly direction, and it has been advanced for a distance of 260 feet. This drift exposed streaks of quartz and clay slips, but no value was found. I deemed it advisable to discontinue work in this drift, and at the present time am pushing forward a west cross-cut, which was started from the main north drift at a point 100 feet north of our south line. The following officers were elected: Charles H. Fish, President; A. B. Hull, Vice-President; A. W. Havens, C. O'Connor and George Frier, with C. E. Elliott Secretary, and D. B. Lyman Superintendent.

MICHIGAN.

The State Salt Inspector's report on the production of salt for the current year shows that the Saginaw and Bay counties make one half the salt produced in the State. Manistee follows, with nearly one quarter, and St. Clair, Iosca, Huron, and Mason furnish all the rest, with an insignificant exception. There are 125 firms engaged in the business, having 142 blocks and 4500 covers, with a total estimated capacity of 5,265,000 barrels. The total product of the year was 4,269,012 barrels, of which 13,903 barrels were solar. The actual increase over any preceding year was 162,079 barrels. Since the manufacture first began in this State there have been produced 41,322,895 barrels. The price began in 1866 at $1.80 per barrel, and gradually dropped to $1.05 ten years later. Then for two years it stood at 85 cents, in 1879 jumped up to $1.02, and from 1880 to 1885 oscillated between 70 and 83⅓ cents. Last year it fell to 66 cents, and this year to 60. The winter closes in with 927,157 barrels (closely estimated) in the bins, and about 600,000 in barrels in the hands of manufacturers.

COPPER MINES.

CALUMET & HECLA MINING COMPANY.—The mine is closed, and gas is still being sent down. Immense timbers are being placed over the weak places where the ground is liable to cave in.

HANCOCK SMELTING WORKS.—Shipments of refined copper from these works during the season of navigation of 1887, as stated by the Houghton *Gazette*, were as follows :

	Pounds.
Calumet & Hecla Mining Company	20 289,391
Tamarack Mining Company	6,003,754
Osceola " "	3,217.092
Franklin " "	3,862.539
Huron " "	9?0,000
Quincy " "	1,560.533
Atlantic " "	661,75?
Allouez Tribute Co., Watson & Walls	24.584
" " " Calumet National Bank	379 028
" " " Fred Smith, trustee	55,?96
" Mining Co	81,65?
J. H. Seager	]3,312
G. Hope, Philip Tucker	1,783
E. Trevillian, Huron	942
St. Clair Tribute Co	13,524
Phœnix Mining Co., J. H. Chandler	10,580
Kearsarge " "	13,526
Cliff Tribute Co	2,270
Detroit & Lake Superior Copper Co	3,275
Total	37.219.908

HURON COPPER MINING COMPANY.—The stopes about No. 8 shaft are giving a better class of rock than has been the case for several months. The product of the mine last week was larger than for any week since the second head was started.

NATIONAL MINING COMPANY.—It has been decided to sink the shaft to the fifth level, and to extend the drift east as fast as possible. The mine is said to have a large amount of barrel copper, which requires no founding, except by hand, and the company will have a considerable quantity ready for shipment in the spring.

IRON MINES.

DETROIT.—At this mine the rise being made in the new ore-body to the south of the old workings has been carried through to the surface, the ore holding out to within about eighteen feet of the entire distance. This gives about 400 feet of ore that is known of. The new shaft has been temporarily abandoned, awaiting developments at this point.

PENN IRON MINING COMPANY.—The old Curry mine is being vigorously explored by the company, and some ore is being found.

MINNESOTA.

CONSOLIDATED VERMILLION IRON AND LAND COMPANY.—This company is about to be organized by the syndicate of American and English capitalists who have just purchased, through Mr. Charles E. Parent, iron properties along the Vermillion range. The capital will probably be $5,000,000. Machinery has been ordered and the work of development will shortly begin. It is said that in case the necessary railway facilities can not be furnished by outside parties, the company will construct lines. The property purchased commences in town 62, range 14, where 120 acres are located, with 160 acres in the same township, range 13. This property is located near the McCumber mine. In town 63, range 12, lying east and south of the Chandler and other mines, several excellent sites were secured. Four thousand acres were bought in town 63, range 11, near the celebrated falls, the only water power on the range. In town 64, range 5, a hill of mephitic iron ore was purchased which is 200 feet long and 20 feet high. Three hundred and twenty acres in town 65, range 5, are also controlled by the company. This property is 150 feet wide and one mile in length.

LONGYEAR MESABA LAND AND IRON COMPANY.—This company has been organized to carry on mining and smelting operations. The articles state that $425,000 of the capital stock has been paid up by the conveyance of 24,800 acres of land in Minnesota. The

officers are: President, J. M. Longyear; Vice-President, C. C. Bloomfield; Secretary and Treasurer, A. B. Robinson. The company will have an office in Minneapolis, but its headquarters are at Jackson, Mich.

MISSOURI.

JASPER COUNTY.

The new smelting furnace of E. R. Moffet, Jr., at Joplin, was destroyed by fire on the 16th inst. The furnace was but recently completed, and had been in operation only one week. There was on hand about 100,000 pounds of lead ore and probably 100 pigs of lead, on which of course there is but little loss. The works will be rebuilt immediately.

MONTANA.

The receipts of gold and silver at the Helena assay office for 1887, approximating December, were: Gold, $1,323,060.26; silver, $31,606.79. The territorial output of precious metal for 1887, it is estimated, will approach $30,000,000.

DEER LODGE COUNTY.

BLACK PINE MINING COMPANY.—It has been decided to sell the property of this company, to the financial difficulties of which we have referred in previous issues, to the White Pine syndicate, which is mainly composed of parties interested in the Black Pine Mining Company.

GRANITE MOUNTAIN MINING COMPANY.—Official advices to us show that the production for the year, up to and including the 19th inst., amounted to 2,774,607·19 ounces pure silver. There are four more shipments to be made this year, which will amount to about 120,000 ounces of pure silver, making the total production for the year about 2,895,000 ounces of pure silver and 1370 ounces of pure gold. Out of this the company has paid $2,000,000 in dividends.

REMINGTON MINING COMPANY.—This company has been organized, with a capital stock of $500,000, shares, $2 50 each. The incorporators and trustees are: Joseph Hanauer, of Miles City, and S. O. Remington and Frank D. Sayers, of Philipsburg. The principal office will be at Philipsburg.

JEFFERSON COUNTY.

DEER LODGE MINING AND REDUCTION COMPANY.—This company has been organized with a capital stock of $5,000,000, shares $10 each. The Nonpareil and Ironclad lodes, on Boulder, are owned by the company. The Nonpareil cross-cut, at a depth of fifty feet, is said to show a large ore-body of carbonate silver and lead ore, assaying twenty-five per cent lead and from twenty-five ounces up of silver. A two-compartment shaft is to be sunk to a depth of 150 feet. The Ironclad has a thirty-foot shaft showing a strong vein of similar ore. The officers of the company are: Conrad Kohrs, president; P. F. Scherr, vice-president; N. J. Bielenberg, treasurer; H. H. Zenor, secretary.

LEWIS & CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—Official reports to us show that the production for November amounted to $110,000, and the working expenses to $49,000. The company has just published the following report, dated the 6th inst.: In the present state of affairs, when every effort is being made by interested parties to spread false reports of a most damaging character to the mine and its management, the directors consider it advisable to make the following statemeut to the shareholders: Reserves, High Grade—The resident director, in answer to inquiries made by cable regarding the reserves of high grade ore at present blocked out and in sight ready for extraction, says "that the amount may be estimated, approximately, at 72,000 tons, but that $35 ore is the highest grade in reserve at present." The shareholders seem entirely to forget what has been stated to them over and over again, viz., that the point of division between high and low-grade ore is $20 per ton; all ore over $20 in value is included in the estimate of reserves as high-grade. Reserves, Low Grade—Of low grade ore (that is, ore of less value than $20 per ton) there is a very much larger quantity now than when the last half-yearly estimate was made. The unexpected change (as it has been correctly termed by a shareholder) has arisen thus: The body of very high-grade ore, running from $50 to $70 per ton, which existed at and for some distance above the 400 foot level in Pixley Nos. 2 and 3 shoots, was found to have been disturbed, as stated by Mr. R. T. Bayliss at the meeting on September 24th last, at the 500-foot level by the crossing of the Armitage lode, and we have now for the present, and until discoveries of very high-grade ore are made we must rely upon ore of about half its value to supply the 50 and 10-stamp mills. It was quite expected that the very rich ore would have lasted until the Jubilee and other rich shoots might be cut in the 600-foot level, and elsewhere. These expectations have not yet been fulfilled, hence the falling of meanwhile in the monthly runs. The above facts should convince the shareholders that there is no reason why they should be unduly alarmed and sacrifice their property, which is one of great intrinsic value. Runs—Mr. R. T. Bayliss has communicated by cablegram received this morning the following estimates for the guidance of the directors and shareholders regarding the monthly runs that may be expected during the next four months: He estimates the run for December at about $110,000, and the average runs for January, February and March, 1888, at about $120,000 or $130,000 per month, and it is expected that there will be a reduction in working expenses, an indication of which is given in the November statement, in which they are shown to be $49,000, as against $56,000 for October. Should the Jubilee or other shoots of very high-grade ore be cut in the meantime, the returns will no doubt be favorably affected. Shareholders will do well to remember that in November, 1884, the mine and its capital of £660,000 was on the verge of being lost to them. Since that date the mine has paid off the then existing mortgage and debts, and in the last two years has returned to its stockholders in dividends more than half the capital of the company, besides paying for the acquirement of several adjoining properties of great value, and further, has paid very large sums out of revenue for machinery, depreciation and reserve funds. It is almost a hopeless task attempting to protect shareholders against undue and unreasoning panic, but the directors trust that this calm statement will allay all disquietude in their minds. The Drum Lummon Provident and Accident Insurance Association of the employés of this company has paid out to members on account of illness and injury during the fiscal year ending November 30th, 1887, $3057.75, and has a balance of $4047.27 on hand.

MISSOULA COUNTY.

WHIPPOORWILL AND LAST CHANCE MINING COMPANY.—This company has been organized with a capital stock of $1,000,000, shares $5 each, to do a general mining and milling business in the Bitter Root Valley, the principal office of the company being at Stevensville. The incorporators are: George W. Wade, William C. Bay, Fred Buck, Amos Buck, and Henry Buck.

SILVER BOW COUNTY.

ARLINGTON MINING COMPANY.—The annual statement filed at the recorders' office, at Butte, shows that the capital stock is $200,000, of which $94,000 is paid in cash, $66,000 in property, and the balance of $40,000 remains in the treasury of the company. The assets consist of the Star West and Mountain Boy lode claims, Independence District; there is no indebtedness.

COLORADO SMELTING AND MINING COMPANY.—The annual report filed at the recorder's office at Butte shows that the principal places of business of the company are at Butte and Denver; the capital stock is $1,000,000, all paid in real and personal property; the assets consists of smelting and concenteating works and plants, lately owned by the Colorado & Montana Smelting Company, near Butte; the Gagnon lode, machinery and improvements, and the Pleiades lode in Summit Valley District; the Burlington, Nettie, Independent, Self Rising, and other claims near the works, in Independence District, and 40 acres of patented land; interest in the Fashion and Gold Hill No. 2 surface ground; all the Barega lode claim, and a majority of the stock in the Original and Jasper lode claims and the Basin Flume Company; ores, wood, supplies, etc., worth $306,371.20. Actual cash value of property, $1,000,000; indebtedness, $54,042.40.

ORIGINAL BUTTE MINING COMPANY.—The annual statement filed at the recorders' office, at Butte, shows that the capital stock is $5,000,000, all paid in mines and mine property. Assets consist of the Original Butte and Jasper lode claims. The indebtedness is $50,552 88, and is unsecured.

NEVADA.

ELKO COUNTY.

The Tuscarora *Times-Review* says: Operations in Navajo Queen, Seal of Nevada and East Grand Prize have been suspended for the winter, owing to the difficulty in obtaining supplies.

COMMONWEALTH MINING COMPANY.—The work of finishing up the hoisting-works is completed; water tanks in, so the work will now be entirely in developing the mine.

NEVADA QUEEN MINING COMPANY.—The stopes above the 100-foot level continue to look well, and yield a good grade of ore. The intermediate drift from winze below the 200-foot level has been stopped. The ore from stopes above this level is high grade, and shows well for continuing. Cross-cut at bottom of winze has not reached any foot-wall. But little headway has been made, as it had to be enlarged to give room to handle the ore and waste. In cutting out, a large amount of high-grade ore has been exposed in every direction. Average assay for the week ended the 16th inst. was $180.

NORTH BELLE ISLE MINING COMPANY.—Official advices to us show that the production for November amounted to $31,677.47.

PONDERE MINING COMPANY.—North drift's incline shaft has developed a fine vein of ore two feet in width, one fourth of its assay value being gold.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle:* The Logan amalgamating process adopted at the new mill at the Chollar shaft, it is said, is proving successful. A larger percentage of the assay value of ore and quicksilver being saved than by any heretofore experimented with, except the Rae electrical process. A total of 800 tons of Potosi ore has been crushed in the new mill since December 1st, the average bullion yield from which was above $20 per ton. There is now in the local office about $20,000 in bullion not yet run into bars for shipment.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The official statement of the ore milled and bullion produced during November shows that there was crushed at the Morgan mill 4580 tons of ore, yielding $95,995.57, of which $45,083.36 was gold, and $50,912.24 was silver. The yield in bullion per ton was $20.96, and the average assay value of the battery samples per ton was $25.82. There was crushed at the Eureka mill 3470 tons of ore, yielding bullion valued at $91,257.39, of which $43,392.15 was gold, and $47,865.24 was silver. The yield in bullion per ton was $26.29, and the average assay value of the battery samples per ton was $30.80. There was crushed at the California mill 3675 tons of ore, yielding bullion valued at $70,868.58, of which $24,049.66 was gold, and $46,818.92 was silver. The yield in bullion per ton was $19.28, and the average assay value of the battery samples per ton was $25.73. The total number of tons of ore worked during the month was 11,725, yielding bullion of the assay value of $258,121.54. The average yield of the ore in bullion per ton was $22.01, and the average assay value of the battery samples was $26.64 per ton. The ore output from the mine during the week ended the 19th inst. was nearly 3500 tons, the pulp assays of which showed an average value of $32.88 per ton, which represents a bullion product of nearly $90,000 assay value. The bullion production, since thenew ore development, made in October, 1886, up to November 30th, 1887, has amounted to $1,594,165 in gold, $2,253,488 in silver, making a total of $4,009,779.

CROWN POINT MINING COMPANY.—The 300 level west cross-cut is showing porphyry and quartz, the latter assaying from $6 to $20 per ton. The 500 level south drift is now within 50 feet of where it should cut the 400 level ore downward continuation developed in east cross-cut No. 3.

HALE & NORCROSS MINING COMPANY.—The daily ore shipments to the Vivian mill from the new development average 50 tons, the pulp assays of which average fully $50 per ton. The uprise above the 700 level continues to show ore with a constant improvement in grade. There is now exposed a total length of 75 feet of ore in the north and south drifts from the 700 level upraise station. The stopes are up four timber sets, showing a hight of nearly 30 feet of ore with the same showing in the face. Operations at other points in the mine are suspended and the shifts transferred to the 700 level.

OPHIR MINING COMPANY.—At a point 35 feet above the 1465 level, in a winze down from the 1300 level, the extraction of fair-grade ore has continued and 108 tons have been hoisted to the surface. A portion of the ore which has been extracted up to the 10th inst. has been shipped to the mill.

SAVAGE MINING COMPANY.—The 400 level west drift is showing low-grade quartz. Ore shipments for the week ended the 10th inst. aggregate 470 tons out of a total of 600 extracted from the stopes between the 900 and 600 levels. The total bullion product to date foots up $65,000.

NEW MEXICO.

BERNALILLO COUNTY.

SAN PEDRO MINING COMPANY.—George William Ballou and the directors of this company were sued on the 21st inst., in the United States Circuit Court in New York, by Lyman D. Stevens, of New Hampshire, who charges that Mr. Ballou and his associates had agreed to give $184,000 of the preferred ftock of the mining company for the Sandia Pipe Line Company. The plaintiff alleges that the pipe line company is of no value, and that Mr. Ballou is interested in it. Judge Lacombe has granied a temporary injunction, restraining them from purchasing the stock of the Sandia Pipe Line Company. The injunction is returnable on December 30th.

The Supreme Court, at Hartford, Conn., has sustained the decision against the Wiley Construction Company in favor of R. D. Wood & Co., of Philadelphia, and the National Tube Works, of Pittsburg, for about $100,000. The case involves the San Pedro mine, and the principal contest for the Wiley company was made by George William Ballou, the banker, who is largely interested in it.

PENNSYLVANIA.

COAL.

NOTTINGHAM.—A terrible explosion occurred in this colliery, at Plymouth, on the night of the 22d inst. Six men who were at work removing the rubbish from the working points of the mine to some disused portion, entered a new chamber in which this rubbish was to be dumped without thought of danger and with naked lights, but a large body of gas had accumulated there, and a terrific explosion followed. All six men were terribly burned, and when the rescue party reached them it was at first believed that most of them were dead. It is impossible to say whether or not any of the injured men will recover.

STANTON.—This colliery near Pottsville will be abandoned about the first of the year. For some months past they have only been shipping about one train a day, and its history is about finished.

SUSQUEHANNA COAL COMPANY.—The hearing of testimony in the case in which the relatives of twenty-six men buried in slope No. 1 of the Susquehanna Coal Company, at Nanticoke, on December 18th, 1885, ask for a mandamus to compel the company to recover the bodies, was begun at Wilkes-Barre on the 18th inst., before the commissioner appointed in the case, Samuel Ennes. A number of witnesses were examined and it became evident that the taking of testimony would be a tedious process, as the whole story of the disaster would be recited with the views of a dozen or two expert miners as to its cause and how it could have been prevented, and how the bodies could be recovered. The company, after a few witnesses had been examined, agreed to waive all preliminaries, admit all that the plaintiff desired to show by these witnesses and argue the matter before the court as a final hearing

as to whether or not a compulsory mandamus should issue. The argument will take place on January 1ts, before President Judge Rice.

WEST BEAR RIDGE.—Arrangements are making to place this colliery in a condition to resume the shipments of coal. The coal from the old tunnel working will be run through this breaker.

NATURAL GAS.

Several of the natural gas companies have issued rates for the new year, which show an advance in price mills of 25 to 40 per cent. The rates to private consumers will also be raised by the companies, it is said, which have been doing the cutting in gas business from 50 to 70 per cent. The Philadelphia Company's charges, based on a coal consumption cost, it is thought will remain the same as now.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 17th:

	1887. Gallons.	1886. Gallons.
From Boston	4,166,026	5,390,293
Philadelphia	156,179,463	145,882,124
Baltimore	8,905,828	15,251,272
Perth Amboy	16,825,695	6,082,059
New York	362,207,194	380,222,573
Total exports	548,284,206	552 828,321

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 23.

Statistics.

Production of Coke on line of Pennsylvania RR. for week ended December 17th, and year from January 1st.

Tons of 2000 pounds.	1887. Week.	1887. Year.	1886. Year.
Tyrone & Clearfield	.....	1,762	.....
Allegnany Region	6,285	246,383	197,826
West Penn. RR	1,880	105,896	104,662
Southwest Penn.RR	67,561	2,776,570	2,563,163
Penn. & W. Region	11,173	365,484	320,111
Monongahela	5,301	120,608	141,864
Pittsburg Region	.....	30	108
Snow-Shoe	1,907	55,961	27,234
Total	84,107	3,672,694	3,427,068

Production Anthracite Coal for week ended December 17th, and year from January 1st:

TONS OF 2240 LBS.	1887. Week.	1887. Year.	1886. Year.
P. & Read. RR. Co.	172,363	7,346,845	11,291,703
Cent. R. R. of N. J.	91.640	4,666.298	*
L. V. RR. Co.	‡	5,427,804	6,042,598
D., L. & W. RR. Co.	156,192	5,916.384	4 933,968
D. & H. Canal Co.	102,634	3,898.516	3,487,761
Penna. RR.	69,925	3,476,590	3,234,045
Penna. Coal Co	29,079	1,541.779	1,443,771
Penna. Canal Co.	.....	480,251	470.951
N. Y., L. E. & W. RR.	.....	†695,487	†861,250
Total	621,833	33.419,954	31,566,047
Increase	.....	1,883,907	.....
Decrease	52,558	.....	.....

* Included in tonnage of Philadelphia & Reading RR.
† Tonnage to December 1st.
‡ Reports discontinued since December 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1882.....28,860,764 | 1884.....30.863,856
1883.....30,566,188 | 1885.....30,431,870

Production Bituminous Coal for week ended December 17th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1887. Week.	1887. Year.	1886. Year.
Phila. & Erie RR	300	21,159	16,756
Cumberland, Md	72,712	3,189,503	2,446,765
Barclay, Pa.	.....	165,950	173,103
Broad Top, Pa.			
H. & Broad Top. RR.	9,605	341,771	371,444
Clearfield Region, Pa.			
Snow Shoe	3,771	156,904	107,324
Karthaus (Keating)	5,126	188,526	144,116
Tyrone & Clearfield	89.652	3,115,966	2,147,519
Tipton	164	15,206	.....
Alleghany Region, Pa.			
Gallitzin & Mountain	19,460	900.973	647,933
Pocahontas Flat Top Coal.			
Norf'k & West. RR.	28,714	1,117,340	834.716
Kanawha Region, W. Va.			
Ches. & Ohio RR	†35,272	1,533,867	1,319,071
Total	264,776	10,747,225	8,208,747

* Tons of 2240 lbs. † Week ending December 7th.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.			
West Penn RR	8,371	299,095	308,845
Southwest Penn. RR.	3,209	114.947	149,222
Pennsylvania RR	2,889	197,487	268,119
Westmoreland Region, Pa.			
Pennsylvania RR.	38 999	1.554,536	1,240,519
Monongahela Region, Pa.			
Pennsylvania RR.	8.618	413,686	386,535
Total	62,077	2,579,751	2,353,240
Grand total	326,853	13,326 976	10 561 987

Anthracite.

This market is firm in prices but much easier in tone. For free burning coals we quote *net* prices, f.o.b.: Broken, $3.85@$4; Egg, $4.10@$4.25; Stove and Chestnut, $4.75; Lehigh coal sells at $4.50 for Broken and Egg; $5 for Stove and Chestnut; $2.85@$2.90 Buckwheat.

The great question which agitates the trade is, "Will Mr. Corbin give in or hold out?" Will he concede the advance to his miners through the year, or will he go back to the basis that the Lehigh is holding out for? And that it was understood he would go back to January 1st if the Lehigh operators did not concede the advance. They have not conceded it, and yet no one knows what Mr. Corbin will do. More than that, Mr. Corbin is reported in the most authoritative manner to have stated yesterday that he had already notified his men that they must go back to the old basis after January 1st, and he is said to have been very emphatic in this declaration. Yet no one knows what Mr. Corbin will do.

The Lehigh Valley Railroad and the Lehigh operators are very certain what they will do, and we are inclined to think that if Mr. Corbin should do exactly the opposite to what he says—which would surprise no one—he will find it far from advantageous to his company. Reading stock was weaker yesterday and is still a little off to-day. Should Mr. Corbin conceed the advance, the stock should go down, for the company can not make any profit with these wages; and if the company stands out for the reduction in wages, its former concessions will probably bring about a strike, which would also cause a decline in the stock.

The uncertainty concerning Mr. Corbin's action has caused some of the other producers to withdraw from the market until after the 1st January.

Bituminous.

There is no change to note in this market. Standard coals are scarce. Shippers are far behind in their contracts, and still complain of a scarcity of cars. We hear of $3.70 per ton being obtained for some Clearfield coals, and there appears every probability that next year's contracts will be made at a slight advance on this. Three dollars and fifty cents per ton is the alongside nominal price now, but in many cases purchasers have had to pay a little more than this.

Boston.

[From our Special Correspondent.]

No cold weather yet, therefore no improvement in the condition of the market. Every one is getting along pretty comfortably. Spot cargoes or cargoes afloat do not have to go begging by any means, but they do not command any premium. A large amount of coal is coming along on old orders just now. On new business the longest detention is from ten days to two weeks on stove. Broken coal can be shipped at once, and on egg there is not more than two or three days delay at the same f.o.b. prices which have prevailed for some time. The labor troubles are beginning to be something of a factor in future calculations, and some anticipate trouble in the Schuylkill district.

There is nothing of note to mention in bituminous coal. It is still slow of delivery and f.o.b. prices are as firm as ever, at $2.60@$2 70.

There is a firm feeling in freights. The barge business of next season promises to be larger than ever. The Boston Towboat Company has just chartered the steamer "Novelty," of 300 tons. This boat is the first and only steamer ever used in mackerel fishing, and after three years, the last two of which have been unprofitable, the business has been abandoned. She cost $40,000, and having powerful machinery will do good service in coal-towing. The development of the coal-towing business of this company has been very rapid. It was begun two years ago and now its fleet numbers 12 barges, having a total carrying capacity of 17,850 tons. A new and powerful steamer, capable of carrying 2500 tons and towing an equal amount, is being built for this company at Wilmington, Del., and has just been launched. This all goes to show the tendency of the coal freighting business.

We quote, exclusive of discharging: New York, $1.25@$1.40; Philadelphia, $1.50@$1.60; Baltimore, $1.60; Hampton Roads, $1.50@$1.60.

The retail dealers association held a meeting a few days ago but decided to let prices stand. Trade is fairly active but not so rushing as it has been.

Buffalo.

Dec. 22.

[From our Special Correspondent.]

The coal trade is unchanged; no extraordinary new features have been observable for some days. The mild weather has had a tendency to check orders somewhat, and demands for immediate delivery have not been so urgent. Stocks here light, but are sufficient for the supply of all the requirements of the dealers and cars are rather more plenty. Quotations nominally without any variation.

Coke steady and unchanged in price. The quotations at the ovens at Connellsville are $2 per ton. The reorganization of the syndicate is talked of, with little likelihood, however, of a satisfactory arrangement being perfected at an early day, although in the future it may be accomplished.

Important improvements are designed on the property of the New York, Lake Erie & Western along the Blackwell Canal and Buffalo Creek. The coal trestles are to be greatly enlarged, and completed in time for next season's business. The pockets will be increased to 92 (at present there are only 32), besides giving them greater storage capacity. By-the-by, the facilities for handling ore are to be largely added to this winter, so as to be ready for the opening of navigation.

The idea of amending the tariff so as to allow coal to enter into the United States free of duty is causing considerable talk among our citizens generally, but has not elicited thus far any positive opinions. Dealers, as usual, are quite reticent on the subject. It would be impossible to find any body of men who say so little outside their business confrères as coal merchants and producers do to reporters and correspondents. It is remarkable how few and far between are the notices that this immense interest receive. Of course, there appear occasionally buncomb squibs, but the paragraphs are taken *cum grano salis!*

The Erie (Pa.) *Herald*, Congressman's Scott's organ published a few days ago an article favoring the abolishment of the duty on coal, which has excited some interest in business circles. "The article is regarded as unusually significant," says a coal man, "in view of the fact that Mr. Scott is one of the largest coal producers in the United States." This matter will only interest producers of bituminous, as no anthracite is imported. The duty on American bituminous coal imported into Canada is 60 cents per ton; the duty on bitumincus coal imported into the United States is 75 cents per ton of 2240 pounds. Anthracite coal is free in both countries.

The *last* loads of coal taken from this port to Chicago and Milwaukee the past season were at $1.50 per ton. Corrected range of prices for season from 60@135 to 60@150c. per net ton to Chicago and Milwaukee.

Errata.—In fifth line of last letter read *last* not *first* propeller. In sixteenth line ditto read Bell, Lewis Yates Company, not Belle Lewis & Yates Company.

Pittsburg.

Dec. 22.

[From our Special Correspondent.]

Coal is without change; no rise yet and no prospect in sight. The late run from Kanawha has reduced prices in Cincinnati and Louisville very materially. The prospect for the miners obtaining an advance is not very flattering. W. H. Brown's Son's Black Diamond Works, in third pool, shut down, the firm refusing to talk about an advance. The other big coal men have all the coal loaded they want.

PRICE OF COAL PER 100 BUSHELS.

First pool	$4.75	Fourth pool	$3.25
Second pool	4.25	Railroad coal	$5.00@5.25
Third pool	3.75		

Connellsville Coke.—The demand continues active. The demand for n ore cars continues. There are various changes and movements going on. What the result will be the future will decide.

Blast-furnace, f.o.b. at works, $2 per ton; Foundry, $2.30; Crushed, $2.

The formation of a new coke syndicate is almost completed. On the 21st inst. a large committee from the Connellsville Producers' Association came to this city and a conference was held. There were present Colonel J. M. Schoonmaker, G. T. Rafferty and, representing the Chicago and Connellsville Company, Mr. Taggert. It was agreed that the H. C. Frick Company be asked to go in with the others and establish a new syndicate. Should it refuse an association will be formed without the firm. It was further agreed to maintain a scale of wages six and one-quarter cents below that now paid by the Frick Company and to uphold the present price of coke. All the independent producers are to be asked to join the syndicate, which agrees to take all the coke they produce and sell it at the market price, the object being to maintain prices and also wages. The meeting then adjourned until Friday.

FREIGHTS.

All Rail Freight Rates from Lake Superior Iron Ore Mines.—The rates recently agreed upon for the coming winter are as follows: From the Gogebic range to Appleton, $1.20 per ton; to Depere, $1.35; to Fond du Lac, $1.40; to Milwaukee, $2; to Chicago, $2.25. The Milwaukee Northern will carry ore from Iron Mountain to Depere for $1.20; to Milwaukee, $1.25; to Chicago, $2, Rates from the Marquette range will be from fifteen to fifty cents higher than the rates from the Menominee range.

The latest actual charters to December 23d, per ton of 2240 pounds:

From Baltimore to:—Bath, 2.00; Boston, 1.75; Bridgeport, 1.60; Brooklyn, 1 45; Charleston, 1.00; Fall River, 1.60; Galveston, 3.00; New Bedford, 1.60; Newburyport, 1.90; New Haven, 1.60; New London, 1.45; New York, 1.45; Portland, 1.75; Portsmouth, N. H., 1.85; Providence, 1.60; Salem, 1.75; Savannah, 1.25; Somerset, 1.60; Williamsburg, N. Y., 1.45; Wilmington, 1 10. Tonnage scarce, and freights are firm with inclination toward an advance.

From Philadelphia to:—Annapolis, 85; Boston, 1.70@1.75*; Charleston, 1.00@1.10; Com. Pt., Mass., 1.75*; East Cambridge, 1 80*; Galveston, 2.75*@3.00; Goergetown, D. C., 1 15; New York, 90§; Norfolk, 80@90; Portland, 1.80*; Washington, 1.15

From New York to:—Boston, 1.25*; Bridgeport, Conn., 65; Cambridge, Mass., 1.25*3c.; Cambridgeport, Mass., 1.25*3c.; Chelsea, 1.25*; Com. Pt., Mass., 1.25*; E. Boston, 1 25*; East Cambridge, 1.25*3c.; E. Greenwich, R. I., 1.00; Fall River, 1.00; New Bedford, 1.05; Newburyport, 1.40*; New Haven, 65; New London, 90.; Newport, 1.00; Norwich, 1.00; Norwalk, Conn., 65; Portland, 1.25*; Portsmouth, N. H., 1.35*; Providence, 1.00; Salem, 1.25*.

* And discharging. † And discharging and towing. 3c. per bridge extra. § Alongside. ‡ And towing up and down. ¶ And towing. †† Pilotage. ** Below bridge * Old B. L.

MARKETS.

NEW YORK, Friday Evening, Dec. 23.

Prices of Silver per ounce troy.

Dec.	Sterling exchange	Lond'n Pence.	N. Y. Cents	Dec.	Sterling exchange	Lond'n Pence.	N. Y. Cents
17	4.85	45	†	21	4.86	44¼	96¼
19	4.85	45⅛	97⅞	22	4.86	44¼	96¼
20	4.85	*	97¾	23	4.86	44½	97

* 45 weak. † 97¼@¾.

Owing to smaller demand for council bills and a

larger allotment on Wednesday, the silver market fell off about 1½ per cent. The week closes with a stronger feeling.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 4 per cent. During the week, the bank lost £77,000 bullion, and the proportion of its reserve to its liabilities was reduced from 46·16 to 44·92 per cent, against a reduction from 43⅛ to 40 3/16 per cent in the same week of last year. Thursday the bank gained £25,000 bullion on balance. The weekly statement of the Bank of France shows a decrease of 2,900,000 francs gold and a gain of 1,150,009 francs silver.

Japanese Gold and Silver Coins.—It is stated that the Government of Japan has decided to call in all the gold and silver coin which it has heretofore kept deposited in banks in foreign countries, in order to pay off public debts abroad without making it necessary to send out money from Japan for the purpose. Heretofore this coin has been allowed to remain in banks abroad without drawing interest.

Copper.—We have again to chronicle higher prices as far as Chili bars are concerned. Values have steadily advanced from day to day in London since our last report, viz., from £80@£80 10s. up to £84 10s., to-day's closing price, but in other descriptions of copper there is a decided lull, and in one market the price of Lake Copper closes about the same as last week, viz., for spot, 17·65@17·70; January, 17·80; February, 17·85; March, 18; April, 18. Although the transactions have amounted to a fair total, yet the business done during the past week has been decidedly less than during the previous weeks since the rise commenced. Outside copper especially has been very difficult to sell. A similar state of affairs is reported from Europe, where best selected kinds are quoted nominally at some £8@£10 below the price of Chili bars.

The London *Standard* of this date (23d inst.) contains a cablegram from their Paris correspondent, that the French syndicate have signed an agreement to maintain the price of copper for two years, but of course this requires confirmation, and in any case it appears very remarkable that refined copper is now offered so much below the price of Chili bars, and this all tends to confirm the opinion expressed in our last week's report that Chili bars have been cornered. Consumers are almost entirely abstaining from buying, but it is thought that they will be obliged to come into the market early in January.

It is well known that producers are quite willing to supply manufacturers at prices considerably below those quoted on the Metal Exchange. Casting brands are obtainable at from ½ to 1 cent below the quotations.

As might have been expected, vigorous efforts are being made to increase production, and we learn that the Boston & Montana Copper Company has commenced mining high-grade ore (running 30 per cent to 35 per cent copper), which it will ship to other smelters, and is likely to considerably increase its own smelting capacity at an early date. This company is understood to have contracted for a large part of its next year's production to European refiners.

While the statistical position of the market is very strong both in this country and Europe, there is a very decided impression that prices can not long remain where they are, though it is not expected that Chili bars will, for a considerable period, go below £65, whatever other brands may do.

The corner in Europe is apparently a strong one and can put prices where they will, but manufacturers here buy direct from the producers, who are almost without exception opposed to the present extent of the boom.

The reports from the Calumet & Hecla fire continue favorable, and it is thought the fire is nearly extinguished, but it will require some months of work after the fire is out to put the mine in good producing condition.

The following cable from Paris has come to hand to-day: "A syndicate has been formed in Paris, France, to maintain the price of copper. It is composed of the Rothschilds, the Comptoir d'Escompte, the Banque de Paris, André Girod & Co., and M. Secretan. The syndicate will undertake for two years, under the direction of the Société des Métaux, the acquisition and sale of copper of mining companies giving their adhesion to the syndicate." All of which is highly interesting and improbable. In the face of such reports and the advance of Chili bars in London, our market is decidedly weaker.

The exports of copper during the week were as follows:

	Casks.	Lbs.	
To Havre—			
By S.S. La Normandie—Copper ...	63	80.115	$8,461
To Germany—	Bbls.		
" Rugia—Copper.....	2	650	79
	Sacks.		
" Rugia—Ore.....	200	22,400	673
To Liverpool—	Bags.		
" Alaska—Matte	1.434	175,350	8,800
" Ohio....	2.458	297.280	15,000
" Arizona.....	3,769	461.060	24.000
	Hhd.		In tr'nsit
" Alaska—Old copper.....	1	1,085	$98
	Pgs.		
" Lake Superior—Old brass..	11	11,156	664

Tin is now only offered in limited quantities, whilst the deliveries on the other side remain very small, and consumers are evidently only buying what they need to meet pressing requirements. Nevertheless, quotations are again somewhat higher and we have to quote spot tin 36¾@37, whilst January has been sold at 36@36¼, and February at 34¼@34⅝. The London market has been well supported at £166 throughout the week, but to-day the price has advanced to £167, whilst 3 months forwards are neglected at about £145@£150.

Lead has also been firm, but not much business doing. The market has been rather irregular, and in some cases quotations have not been sustained. We quote Spot, 5@5·05c.; January, 5·05@5·10c.; February, 5⅛c. In London the prices quoted to-day are, £15 10s. to £15 15s. for Spanish lead.

Messrs. Everett & Post, of Chicago, telegraph to-day as follows: The market remains about the same, if anything a shade weaker, as there are no buyers. Refiners hold stiff at 5c., but some outside lots of Common have been sold at 4·85c. There is really no business to test values.

Messrs. John Wahl & Co., of St. Louis, telegraph to-day as follows: Market steady, 4·80c. bid, 4·85c. asked.

Spelter is quiet but firm. Domestic must be quoted 5⅝@5⅝, according to brand, whilst for foreign the quotations have again been advanced and several lots have changed hands at 6·30@6·35c. European advices report a continued scarcity, and the few consumers who had not previously covered their requirements for the winter months were alarmed and recently bought up what was available at almost any price asked.

Sheet Zinc is firm at 6¾@7c.

Antimony.—In this article a large business has again been done, and 11½c. has been freely paid for Hallett's, while Cookson's is not obtainable below 13@13½c. The English makers are entirely out of the market for the next few months.

Quicksilver.—The market remains unchanged. In London the price has ruled at £11 per flask, and here at from 70@75c. per pound.

Nickel remains in a satisfactory position, with quotations unaltered at 65c.

Chemicals.—There are no new features to report in the chemical market. During the past week there have been few sales, dealers only buying in sufficient quantities to tide them over till the first of the year.

The market for Bleach is very dull, prices being from 1·95c. to 2c. The dullness of the New York market is due to the fact that bleach may be had in Boston for 1·82½@1·85 spot.

Nitrate of Soda is firm at 2·10@2·20c.

Sulphate of Ammonia is quoted at 3·25@3·50c., according to quantity.

Sal Soda is a trifle lower, quoted prices being 95c. spot.

No change is reported in the brimstone market.

Caustic Soda, 48 per cent, is quoted 1·30c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 23.

During the past week the market for American pig-iron has shown a decided firmness. No. 1 Foundry irons continue as scarce as ever, and in as active demand. Several sales have been made for spring delivery of both Northern and Southern irons, and there are a number of negotiations pending. Forge irons also show more strength, and we hear of considerable sales at full prices.

On the whole, it may be stated that the buyers are actually in the market for next year, and the general impression is that present prices will be maintained for several months ahead. The naming of prices for next year by the Thomas Iron Company, an event always of great interest in the pig-iron market, has been deferred by the illness of President B. G. Clarke.

The generally firmer tendency in the American pig-iron market is also, to considerable extent, in sympathy with the better tone of the British markets. The makers of hematite irons agreed a few weeks ago to a curtailment of production, which has stiffened prices. The home market in England and Scotland has also been greatly improved by the good condition of the ship-building trade, as we pointed out two weeks ago.

Scotch irons are a little firmer here, though practically unchanged in Glasgow.

Bessemer pig is to-day without interest, although spiegel is rather firmer. Foreign blooms and bilets are almost neglected.

The effect of the German combination on steel wire rod has made itself further felt in advancing quotations, though there has been little new business.

The week has shown much greater activity in steel rails, of which fully 60,000 tons have been sold at prices generally equal to $32@$33 at Eastern mills.

Some sales are reported both below and above these figures. We reported last week sales of 20,000 tons (including 15,000 to the Lehigh Valley Railroad); we now learn of an additional sale of 10,000 tons last week, so that fully 90,000 tons have been sold in the last two weeks for next year's delivery. The present prices of American rails are practically prohibitive of importations. In fact our mills are now selling to the Southern railroads below the price of foreign rails.

The makers of structural iron continue very busy, with plenty of work ahead. Some large bridge orders have recently been placed.

Old rails are on the whole firmer, and there is rather more disposition to buy. It is not likely that any quantity could be bought at the lowest quotations, although it is also true that lots are offered at low prices without finding prompt buyers. Quotations are nominal.

Louisville. Dec. 13.

[Reported by GEO. H. HULL & CO.]

The Louisville pig-iron market continues dull, and doubtless will remain so until after December 31st. Foundry irons are in the least demand. Furnaces have declined to book a number of orders for choice brands, as those brands have been kept sold up. A livelier market is expected next month, and buyers will doubtless suffer inconvenience by inability to get the brands preferred. Nothing else of special interest to note. We repeat the last week's prices.

Pittsburg. Dec. 22.

[From our Special Correspondent.]

Wait, that's the word that is most used. When you inquire how is the iron market, the answer is, "Wait until after the first of January." Well, as that part of the business is something that we don't control, we have to be satisfied with the answer and wait. The condition of the pig-iron market the past week has been anything but satisfactory to the sellers and furnace men. Sales were confined exclusively to small lots required to keep up mixtures.

It is true that several parties have expressed a willingness to buy even round lots if a price low enough is made, but the difference in views between buyers and sellers prevents transactions. A leading dealer remarked I could have sold several hundred tons if I had excepted buyer's offer—which I declined, because it did not cover the cost. One thing has developed beyond doubt, and that is that it would be better for all concerned to stop the works than to continue to operate and sell at prices that are now offering. While prices have been steadily declining, there has been no decline in wages—coke freights, or in fact anything that is required to make iron. This state of affairs can't continue much longer, there must be a settlement and that is not far off.

The Charlotte Furnace Company, at Scottdale, has notified its employés of a 12½ per cent reduction in their wages from January 1st. The Edgar Thomson furnace D was blown out and two other furnaces "banked," making a decrease in production of pig-iron of 600 tons per day. There can be no doubt others will follow, and it may be set down as a fact they will not start up until they can see their way clearly. The present position of the iron trade is a matter of more than ordinary interest, and to many a source of profound perplexity. There has been no time for years when it was so difficult to define the position or to outline the probable course of the market in the near future. As it is at this time, besides the tariff agitation, there is the question of competition from new sources. Apart from legislative influences the position is a complicated one, so that it is no wonder that the feeling is indifferent as regards new contracts. While buyers talk lower prices, sellers see very little money in the business at present prices, while lower figures would be certain loss unless accompanied by reductions in cost, of which there is no immediate prospect. Corrected quotations will be found in our weekly register of prices.

SALES REPORTED SINCE OUR LAST.

Coal and Coke Smelted Lake Ore.	
500 Tons Standard Bessemer.....	19.00 cash.
500 Tons Standard Bessemer	18.75 cash.
350 Tons All Ore Mill	18.0 cash.
250 Tons Gray Forge.....	16.50 cash.
100 Tons No. 2 Foundry.....	19.00 cash.
125 Tons Gray Forge.....	16.50 cash.
50 Tons Foundry.....	18.00 cash.
Coke, Native Ore.	
200 Tons Gray Forge...	16.50 cash.
250 Tons Gray Forge	17.00 4 mo.
100 Tons Mill Storage.....	16.25 4 mo.
100 Tons White	15.75 cash.
65 Tons No 2 Foundry.....	18.00 4 mo.
40 Tons Silvery....	18.50 cash.
20 Tons Silvery	18.75 60 da
25 Tons Gray Forge.....	16.50 cash.
Steel Billets.	
300 Tons Steel Billets	29.50 cash.
Muck Bar.	
500 Tons Good Neutral.....	29.25 cash.
Steel Wire Rods.	
500 Tons Steel Wire Rods (Baltimore).	39.50 cash
Steel Slabs.	
500 Tons Steel Slabs (Baltimore).....	29.25 cash.
Old Iron Rails.	
200 Tons American Ts.....	23.75 cash.
200 Tons American Ts, Light.....	23.00 cash.

Philadelphia. Dec. 23.

[From our Special Correspondent.]

As usual at this season of the year there is very little new business. Some brokers assert that crude iron has taken a step backward, and if a few sales of inferior forge and foundry are to be taken as evidence of it, it is true. The sales in question were for moderate sized lots, spot cash. It is probable the sales are made to meet January bills. Inquiry at some of the stronger companies fails to show any general weakness or even anxiety to book heavy orders for winter. Several furnaces will probably blow out next month, at least the companies talk in this way. No. 1 Foundry is selling at $21 to $21.50; No. 2, $18 to $19. Gray Forge is held at $17, and $16.50 is being offered for some brands. The tendency in cost is upward but the price of coal is a little easier. Coke is still rather scarce, and the supply is not in excess of the current demand. Nothing new is being done in foreign material, and quotations are merely nominal. Brokers are not attempting to make business by offering any concessions. Merchant bars are rather dull, and several mills will be in the market early in the month. A few will not resume double turn, but be content to work along single turn for a few weeks until business shows up better. The nail makers report the usual winter dullness and stocks are beginning to accumulate. Some makers have declined to sell at the bottom prices of the past two or three weeks. Consumers are not disposed to take advantage of the exceptionally low figures which in some cases are certainly below cost. Plate iron is weak. Two or three manufacturers have offered to accept large lots at very low prices, but buyers are withholding orders. Tank iron is moving in small lots to large consumers who prefer to buy in this way rather than cover extensively. There is nothing new in sheet iron. Merchant

WEEKLY REGISTER OF

CURRENT QUOTATIONS.

This list is the result of careful compilation and is destined to meet the demands of all classes of subscribers. The prices quoted are those actually ruling in our own and foreign markets. Manufacturers and importers will please give notice of all modifications not later than Friday noon each week.

CHEMICALS.

Acid—Sulphuric, 60°, per 100 lbs.. 90
Sulphuric, 66°, per 100 lbs 1.10
Hydrofluoric, per 100 lbs..... 95
Muriatic, 18°, per 100 lbs 1.20
Muriatic, 20°, per 100 lbs..... 1.35@1 50
Nitric, 36°, per 100 lbs ..... 4.50@5.00
Nitric, 42°, per 100 lbs..... 6.00
Alkali—36 p. c ..... 1⅛@1 1-10
Refined, 58° 1.25
Alum—Lump, per lb..... 1¾
Ground, per lb 2
Lump per ton, Liverpool £5
Sulphate of Alumina £4 12 0
Aluminum—(Metallic), per lb .12 00
Ammonia—Sul., per 100 lbs. 3.00@3.50
Carb., per lb..... 7¾
Muriate, per lb..... 7
Antimony—Hallet's, per lb..... 8¼
Cookson's, per lb 9¼
Arsenic—Metallic, per lb..... 32
White, powdered, per lb 2¾
White, glass..... .
Red, per lb 6½
White, at Plymouth, per ton. £21 0 0
Asbestos—American, p. ton..... 20 00
Italian, p. ton, c. i. f. L'pool ...£18 0 0
Asphaltum—P. ton 13.00
Prime Cuban, ₱ lb ..... 5@6c.
Hard, ₱ ton..... $28.00
Trinidad, refined, ₱ ton $30.00
Barium—(Metallic), per lb..... 975.00
Barytes—Sulph., Am. prime white 16.00
Sulph., foreign, floated, p. ton....19.00
Sulph., off color, p. ton 12.50
Carb., lump, f.o.b. L'pool, ton £6 0 0
No. 1, casks, Runcorn " £4 10 10
No 2, bags, Runcorn " " 3 15 0
Bismuth—(Metallic), per lb..... 2.40
Bleach—Over 35 p. c., per lb..... 1.95c.
Borax—Per lb 6¼
Refined at Liverpool, per ton..£26 10 0
Bricks—Pale, per 1,000 ..... 5.00
Jerseys, per 1,000 ..... 7.50
Haverstraw, per 1,000..... 8.50
Front bricks, per 1,000, from.....10.00
Brimstone—*See Sulphur.*
Bromine—Per lb..... 36
Building Stone—Amherst freestone, per cu. ft., from..... 75
Brownstone, per cu. ft., from..... 1 00
Granite, rough, per cu. ft., from.. 45
Cadmium—(Metallic), per lb..... 1.45
Calcium—(Metallic), per oz.....150.00
Cæsium—(Metallic).....
Cerium—(Metallic) per oz..... 168
Cement—Rosendale, per bbl..... 1 00
Portland, American, per bbl..... 2 00
Portland, foreign, per bbl..... 2 25
Chalk—Per ton..... 3.00
Precipitated, per lb..... 4
China Clay—English, per ton....18.50
Southern, per ton..... 13.50
Chrome Yellow—Per lb 8
Chromium—(Metallic), per lb...200.00
Cobalt—(Metallic), per lb..... 7.00
Cobalt—Oxide, per lb..... 2.15
Copper—Sulph. English Wks, ton £13 10 0
Precip., English Works, unit.. fluctuating
Copperas—Common, per lb ....$ 70
Best, per lb..... 1.20
Liverpool, per ton, in casks, £2... 1.20
Cream of Tartar—Am. 99 p. c. lb 35
Powdered, 99 p c..... 36
Didymium—(Metallic), per oz...160.00
Emery—Grain, per lb 3½
Flour, per lb 2½
Erbium—(Metallic), per oz.....140.00
Feldspar—Ground, per ton..... 14.00
Fuller's Earth—Lump, per bbl. 95
Powdered, per lb..... 2
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) .....
Green—Emerald, per lb..... 25
Brunswick.....
Gypsum—Calcined, per bbl..... 1.25
Indium—(Metallic), per oz..... 158.00
Iodine—Resublimed..... 3.50
Iridium—(Metallic), per lb..... 700.00
Kainit—Per ton..... 8.50
Kaolin—*See China Clay.*
Lanthanum—(Metallic), per oz.175.00
Lead—Red, per lb..... 6
White, American, in oil, per lb.... 6¼
White, English, per lb 7½
Acetate, or sugar of..... 12
Litharge—Powdered, per lb 5½
English flake, per lb..... 9
Lithium—(Metallic), per oz.....160.00
Magnesite—Syrian, per ton..... 15.00
Magnesium—Per lb..... 4.00
Mineral Wool—Per lb 2
Mica—
In sheets according to size, 1st quality, ₱ lb..... .
In sheets according to size, 2d quality, ₱ lb..... .
Molybdenum—(Metallic) per lb 6.00
Nickel—(Metallic), per lb.. .....125.00
Niobium—(Metallic), per oz.....128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb...512.00
Platinum—(Metallic), per lb ..148.00
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston..... 5.80
Ground, per ton f. o. b. New York.10.00
Canadian Apatite, lump, f. o. b. at shipping port, per unit..... 24
Manganese—lump, c. i. f. Liverpool, per ton.....£3 2 6
Per unit, up or down..... .....£0 1 3
Ground..... .....£6 0 0
Metallic, per lb 1.10
Mercury—*See Quicksilver.*
Mercuric-Chloride—(*Corrosive Sublimate*) per lb..... 55
Phosphorus—Per lb..... 70
Plumbago—Ceylon, per lb..... 4
American, per lb..... 7
London, per cwt..... .....£0 15 0
Potassium—Metallic, per oz..... 2.00
Cyanide, per lb..... .....
Bromide, per lb..... 37
Chlorate, per lb..... 14
Carb. per lb..... 5
Caustic, per lb..... 7¼
Iodide..... 2.10
Muriate, per 100 lbs..... 1.70
Nitrate, refined, per lb..... 6
Bichromate, per lb..... 10½
Sulphate, per 100 lbs..... 1.10
Yellow Prussiate, per lb..... 19
Red Prussiate, per lb..... 42
Pumice Stone—Select lumps, per lb..... 2½
Original cks., per lb..... 1½
Powdered, pure, per lb..... 1¾
Pyrites—Non-cupreous, p. unit, s. 10
Quartz—Ground, per ton 18.00
Quicksilver—Per lb..... .68@70c.
London, per flask of 75 ..... £10 10s.
Rotten Stone—Powdered, per lb. 8½
Lump, per lb 5
Eng., powdered, per ton £4
Lump, per ton..... £5
Rhodium—(Metallic), per lb....512.00
Ruthenium—(Metallic), per oz. 112.00
Rubidium—(Metallic), per oz...200.00
Salt—Liverpool, ground, per bbl. 70
Turk's Island, per bbl 25
Salt Cake—Per 100 lbs 55
Saltpeter—Crude, per lb..... 4½
Refined, per lb..... 6
Silenium—(Metallic .....
Slate—Purple and green roofing, per 100 ft..... 6.00
Red roofing, per 100 sq ft..... 15.00
Black roofing, per 100 sq. ft..... 5 00
Soda Ash—Carb., 48 p. c., p. 100 lbs 1.30
Caustic, 48 p. c., per 100 lbs.. 1.30
Caustic, 50 p. c., per 100 lbs..... 1.38
Sal, English, per 100 lbs 95
Sal, American, per 100 lbs 1.15
Nitrate, per 100 lbs..... 2.25
Sodium—(Metallic) per lb..... 4.50
Spelter—See Zinc.
Strontium—(Metallic), per oz..128.00
Nitrate, per lb 10½
Sulphur—Roll, per lb..... 1½
Flour, per lb 1¾
Crude Brimstone, 2s., per ton....22.00
Crude Brimstone, thirds, per ton..20.00
Talc—Ground French, per lb..... 1¼
Domestic, per lb..... 6
Domestic, per ton..... .....15.00
C. i. f. Liverpool, per ton..... £4 5 0
Tannin—Pure, per lb. .....
Tantalum—(Metallic) per oz .. 144.00
Tellurium—(Metallic) per oz.... 9.00
Thallium—(Metallic) per oz..... 3.00
Titanium—(Metallic) per oz....32.00
Thorium—(Metallic) per oz.....272.00
Tungsten—(Metallic) per oz..... 4.00
Vanadium—(Metallic), per oz..320.00
Vermillion—American, per lb... 50
English, per lb. 65
Vitriol—(Blue), Ordinary, per lb.. 5
Extra, per lb 5¼
Yttrium—(Metallic), per oz 144.00
Zinc oxide—Am., Dry, per lb.... 4½
Antwerp, Red Seal, per lb.....6½@6½
Paris, Red Seal, per lb..... 6¾
Zirconium—(Metallic), per oz..240.00

IRON AND STEEL.

New York Prices.

American Pig-Iron,
No. 1 X..... $20.50@$21.50 at tidewater
No. 2 X..... $18 50@$19.50 " "
Forge..... $17@ . " "
Scotch Pig—Coltness..... $22.00@$22.25
Clyde..... 20.50@ 21.00
Dalmellington..... 21.00@ 20.50
Summerlee..... 21.50@ 21.75
Gartsherrie..... 21 50@ .
Shotts..... 21.75@ 22.00
By Cable to day to the Metal Exchange :
Scotch Warrants..... 43s. 6d.
Coltness, at Glasgow ..... .53s. 6d.
Langloan, at Glasgow ..... 51s. 6d.
Summerlee, at Glasgow..... 51s. 6d.
Gartsherrie, at Glasgow..... 48s. 6d.
Glengarnock, at Ardrossan..... 48s. 6d.
Dalmellington, at Ardrossan..... 45s. 6d.
Eglinton, at Ardrossan ..... 44s. 9d.
Bessemer Pig—
Foreign, nominally..... $20.75@$21.00
Domestic..... $19 at furnace
Spiegeleisen—
German, 20 per cent..... $26.00@$26.50
English, 20 " " 27.00
" 30 " " ..... 31.00@ 31.50
Ferro Manganese..... 55.00
Steel Blooms..... 30.00@ 30 50
Steel Billets ..... 30.00@ 30.50
Steel Nail Slabs..... 30 50@ 31.00
Steel Wire Rods..... 41.00@ 41.25
Steel Rails—
Heavy sections, at mill....$32.00@ 33.00
Light " " .... 33.50@ 38 50
Structural Iron and Steel—
Bridge Plate, at mill..... 2·20@2¼c.
Angles, at mill ..... 2·3@2·4c.
Tees, at mill..... 2·6@2·8c.
Steel Angles, at mill..... 2·6@2·75c.
Beams and Channels, on wharf, 3·3c. base.
Steel Plates—
Tank and Ship, on wharf..... 2·7@2·9c.
Boiler Shell, on wharf..... 3 @3¼c.
" Flange, " ..... 3¼ @3½c.
" Fire-Box, on wharf..... 4 @4¼c.
Iron Plates—
Common tank, on wharf....2¼@2 3-10c.
Refined tank, on wharf.....2 4-10@2¼c.
Boiler shell, " ..... .2¼@2 6-10c.
Boiler flange, " .....3⅛@3 7-10c.
Extra flange, " .....4 @4¼c.
Bar Iron—
Refined..... .....2@2·1c. base.
Common..... 1·9@2c. "
Merchant Steel—
American tool ..... 8½@10c.
Special grades..... 13 @20c.
Crucible machinery..... 5 @6c
" spring..... 4½c.
Bessemer machinery..... 2·2@2·5c.
" spring. ..... 2·2@2·5c.
Cast-Iron Pipe—
According to size..... $27 00@$34.00
Wrought Iron Pipe—List adopted Oct. 26, 1887.
Butt-Welded, Plain and Tarred, 47½ per cent disc.; Galv., 37½ per cent disc.
Lap-Welded, Plain and Tarred, 57½ per cent disc; Galv., 45 per cent disc.
Boiler Tubes—52½ per cent disc.; Casing, 50 per cent disc.
Rail Fastenings—
Spikes..... 2·3 @2·4c. delv'd
Angle Fish-bars..... 2·10@2·15c.
Bolts and Sq. Nuts .....2·9 @ 3c.
" " Hex. " .....3·1 @3·2c.
Wrought Scrap—
Foreign *ex ship*..... $20.00@$20.50
No. 1 Yard ..... 20.50@ 21.00
Cast Scrap ..... 15.00@ 16.00
Old Car Wheels..... 19.00@ 19 50
Old Rails—Tees ..... 21.50@ 22.00
—Doubles ..... 22.00@ 22 50
Nails—In car-load lots, .. 1.90@ 2.00
—From store ..... 2.00@ 2.05

Louisville Prices.

Pig-Iron—
So. Coke, No. 1 Foundry..$20.00@$20.50
" " No. 2 " .. 19.00@ 19.50
" " No. 2½ " .. 18.00@ 19.00
Hg. Rock Coke, No. 1 F'dry 19.50@ 20.50
" " Charcoal, No. 1 Foundry..... 22.50@ 24.00
So. Charcoal, No. 1 F'dry .. 20.50@ 21.50
Silver Gray, different gr'des 17.50@ 19.00
So. Coke, No. 1 Mill, Neutral 17.25@ 18.25
" " No. 2 " " 16.75@ 17.75
" " No. 1 Mill, Cold Short..... 16.75@ 17.75
So. Charcoal, No. 1 Mill..... .....
White&Mottled, diff't gr'ds. 15.00@ 16.00
So. Car-Wheel, St'rd Br'nds 24.00@ 25.00
" " Other " 22.00@ 23.00
Hanging Rock, Cold-Blast.. 24.00@ 25.00
" " Warm-Blast 20.00@ 21.00

Philadelphia Prices.

Foundry No. 1..... ... $21.00@21.50
Foundry No. 2..... 18.50@19 00
Gray Forge..... 17.00@16.00
Bessemer Pig..... ....
Steel Rail Blooms ..... 29.50@nom.
Foreign Bessemer..... 20.00@20.50
Spiegeleisen. ..... 26.50@27.50
Scrap, Selected..... 22.00@. ....
No. 1 ..... 21.00@20 00
Cargo Scrap..... 21.00@20.50
Muck-Bars..... 30.50@. ....
Merchant Iron..... 1.90@@2.10c.
Plate Iron..... 2.10@ 2.30
Tank Iron..... 2.40@ 2.50
Skelp Iron..... 2.00@ 1.90
Angles..... 2.30@.. ..
Beams and Channels..... 3.30@. ....
Nails ..... 1.90@ 2.00
Steel Rails. ..... 32.50@33.50
Old Rails..... 22.00@22.50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1..... ..$18 60@19.00
Foundry No. 2..... 17.60@18.00
Gray Foundry No. 3..... 16.75@17.00
" " No. 4..... 16.25@16.75
White ..... 16.00@16.50
Mottled..... 16.00@16.50
Silvery 19.00
Bessemer..... 19.00@19.25
Charcoal Pig—
Foundry No. 1. ..... 25.00@25.75
Foundry No. 2..... 24.00@24.75
Cold-Blast..... 26.00@30.00
Warm-Blast..... 25.00@27.00
20 p. c. Spiegel..... 28.00@28.50
Muck-Bar..... 29.25@29.50
Steel Blooms..... 29.00@29 25
Steel Slabs ..... 29 00@29.50
Steel Crop Ends..... 20.00
Steel Bloom Ends..... 19.00@19.25
Steel Billets..... 29.00@29.50
Old Iron Rails..... 24 00@25.00
Old Steel Rails..... 21.75@22.50
No. 1 W. Scrap..... 20 00@20.25
No. 2 W. Scrap..... 18.00@18.25
Steel Rails..... 33.00@34.00
" light sections... 33.00@
Bar Iron, nominal..... 1.90@ 2.00
Nails $2 net car lots.
Steel Nails $2 net car lots. Two per cent off for cash.
All descriptions of iron are nominal. Steel rail men report no demand, prices being uncertain.

ALUMINUM.

Bronze (10 %), ₱ lb..... 40c.

COPPER.

Lake Ingot, ₱ lb..... ...17@18c.
Electrolytic, ₱ lb ..... 17c.
Casting Brands, ₱ lb ..... 15c.
Arizona Black .....
Matte, ₱ unit of Copper .....
Chili Bars, London, ₱ ton.....£84 5s.
Am. Matte, Liverpool, ₱ unit....
Sheet Copper (according to size), ₱ lb..... .....20 @40c.

Lead—
Domestic, Common..... 5@5.05c.
Domestic, Refined ....
Foreign ....5.40@5½c.
Sheet, ₱ lb..... 6 @ 7c.
Pipe, ₱ lb ..... @ 7c.
Tin-lined Pipe, ₱ lb.....15c.
Shot, ₱ lb..... 6 @ 7c.

Tin—
Tin Plates..... .....15s. 3d.
Tin Spot..... .....£166
Banca pigs, ₱ lb..... 37@37½
English, pigs, ₱ lb.....
Straits, pigs, ₱ lb .....
Straits in bars, ₱ lb.....
Ch., bright I. C., ₱ box.....
Coke, bright, ₱ box. .....
Coke, Ternes, ₱ box..... ....

Zinc—
Domestic spelter, ₱ lb..... 5⅝@5⅞
Foreign spelter, ₱ lb ..... 6.10@6.30
Silesian, London, ₱ ton..... £21
Sheet, American, ₱ lb .....
Sheet, foreign, ₱ lb.....

STOCK MARKET QUOTATION

Baltimore Stock Quotations.

COMPANY.	Bid.	Asked.
Atlantic Coal	$1.40@$1.45	$1.75
Balt. & N. C.	.33@.37	.40
Big Vein Coal	....	....
Conrad Hill	.12@.15	.18
Diamond Tunnel	.50	..
George's Crk. C.	95.00	100.00
Lake Chrome	.05	.13@.16
N. State, Balto	.20@.23	.70
Ore Knob	.10	.14@.15
Silver Valley	1.50@1.55	....

Highest and lowest prices bid and asked during the week ending December 22d.

Birmingham, Ala., Stock Quot.

COMPANY.	Bid.	Asked.
Ala. Conn. C.	....	100
Bir. Min. & Mfg.	175	201@210
Decat. L. Imp. & Fur	24 @ 26	26 @ 27
DecaturMin. L.	....	30¼@ 31
Enterprise Mfg	38 @ 45	50 @ 85
Sloss I. & S.	....	....
* Sloss I. & S.	....	....
Sheffield C & I.	62½@ 65	69 @ 71
WoodstockS&I	....	52½

* Bonds.
Highest and lowest prices bid and asked December 20th.

Pittsburg Stock Quotations.

COMPANY	H.	L.	Closing.
Bridgewater Gas	99.00	97.00	99.00
Chartiers Val. Gas.	79.00	79.00	78 00
La Noria Mining	3.00	2.75	3.00
M'f'turers' Gas.	26.00	20.00	24.00
Ohio Valley Gas.	....	....	....
Pennsylvania Gas.	25.00	25.00	25.00
People's Nat. Gas.	....	....	....
Philadelphia Gas.	49.12½	48.25	48.50
Pittsburg Gas Co.	58.00	54.00	58.00
Silverton Mining	1.50	1.50	1.50
W't'h'se Air-Brake.	150.00	145.00	152.00
W't'ghouse Brake.	....	....	....
Westmoreland & Cambria Gas	49.00	49.60	49.00
Wheeling Nat. Gas.	24.25	24.50	24.00
Yankee Girl Mining	....	....	....

Highest and lowest prices bid and asked during the week ending December 22d.

St. Louis Mining Stocks.

	Bid.	Asked.
Adams, Colo	$2.50	$2.75
Black Oak, N. Mex	.70	.72½
Bremen, N. Mex	....	....
Cariboo, N. Mex	52½	.55
Cleveland, Colo.	....	....
Courtland	....	..
Dinero, Colo	.25	.30
Granite Mountain, Mont.	58.25	60.00
Gray Eagle, N. Mex	.22½	.25
Golden Era, Mont	1.00	1.05
Hope, Mont.	6.80	7.00
Ideal, Colo.	....	....
Jumbo, Colo	.82½	.85
Juniper, Ariz	.17½	.25
Laclede, N. Mex	....	....
Peacock, N. Mex	.17	.20
Pat Murphy, Colo	1.25	1.30
Quincy, Colo	....	....
Sheridan, N. Mex	.15	.16½
Small Hopes Cons., Colo	4.75	5.00
St. Lu. & Mex. Imp., Mex.	.20	.35
San Louis & San F., Mex	....	....
St. Louis & Yavapai, Ariz.	.11½	.15
West Granite, Mont	.85	.90

London Quotations.

COMPANY.	Highest.	Lowest.
Alturas Gold, Idaho	19s. 6d.	19s.
Arizona Copper, Ariz.	21s.	20s.
Birdseye Creek, Cal.	8s.	6s.
California Gold, Colo.	8s. 6d.	7s. 6d.
Carlisle, N. Mex	£1¼	£1
Centennial, Cal.	....	....
Charles Dickens, Id.	4s.	3s.
Colorado United, Colo.	20s	15s.
Denver Gold, Colo.	2s. 6d.	2s.
Eberhardt, Nev	5s	4s. 6d.
Empire, Mont	£2⅞	£2¾
Flagstaff, Utah	6s. 6d.	5s. 6d.
Garfield, Nev.	26s. 3d.	25s. 9d.
Gold Hill, N. C.	3s. 6d.	2s. 6d.
Kohinoor, Colo.	2s. 6d.	1s. 6d
Montana Lt., Mont	£2⅞	£2⅝
New California, Colo.	8s. 6d.	7s. 6d.
New Consolidated	2s. 6d.	2s.
New Emma, S., Utah	5s. 6d.	5s.
New Hoover Hill, N. C.	3s.	2s.
New La Plata, Colo.	3s. 6d.	2s. 6d.
Pittsburg Cons., Nev.	31s.	30s.
Plumas Eureka, Cal.	£⅜	£¾
Richmond Con., Nev.	£5	£4¾
Ruby&Dunderberg, Nev	4s. 6d.	3s. 6d.
Russell Gold, N. C.	3s. 9d.	3s. 3d.
Sierra Buttes, Cal.	£⅞	£⅝
Stanly, N. C.	£1	£⅞
Union Gold, Colo.	6s.	4s.
U. S. Placer, Colo.	£1	£¾
Viola Lt., Idaho	£1 7-16	£1 5-16

Highest and lowest prices December 10th.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last			Dividends. Total paid.	Dividends. Date and amount of last		
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*				$555,000	Jan.	1887	10
2	Alice, s. C.	Mont	10,000,000	400,000	25	*				750,000	Sept	1886	.06⅔
3	Alturas, G.	Idah.	1,500,000	3 0,000	5					95,000	Sept	1886	.50
4	Amie Con., s. L.	Colo.	5,000,000	500,000	10	*				330,000	Oct.	1883	.05
5	Amy & Silversmits, s.	Mon.		341,419						247,530	Aug.	1887	.12½
6	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	360,000	Jan.	1887	1.00
7	Argenta, s	Nev..	10,000,000	100,000	100	295,000	July	1885	.10	40,000	Feb.	1880	20
8	Aurora, I.	Mich.	2,000,000	100,000	20					155,000	Oct	1887	1.87½
9	Bassick, G. S.	Colo.	10,000,000	100,000	100	*				400,000	Mar.	1884	1.00
10	Belle Isle, s.	Nev..	10,000,000	100,000	100	160,000	Feb	1887	.20	300,000	Dec.	1879	.25
11	Belcher, G. S.	Nev..	10,400,000	104,000	100	2,269,335	Sept	1887	50	15,397,000	Apl.	1876	1.00
12	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	57,500	Nov.	1887	25	200,000	Jan	1887	.10
13	Big B'nd Hydraulic, G	Dak..	1,000,000	200,000	5	*				253,000	Aug.	1887	.03
14	Black Bear, G.	Cal..	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
15	Bodie Con., G. S.	Cal..	10,000,000	100,000	100	424,990	Aug	1887	.50	1,602,572	Apl.	1885	.50
16	Bonanza Developm't	C&M	3,000,000	300,000	10					135,000	Oct.	1882	.15
17	Bonanza K'g, Cons.s.	Cal..	1,000,000	100,000	10	*				185,000	Feb.	1885	.10
18	Boston & Mont, G.	Mont	2,500,000	250,000	10	*				520,000	Jun	1886	.15
19	Breece, s.	Colo.	5,000,000	200,000	25	*				2,000	Feb.	1880	.01
20	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July	1887	.05
21	Bulwer, G.	Cal	10,000,000	100,000	10	60,000	July	1887	.20	175,006	Jan.	1884	.10
22	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	40,000	Feb.	1886	.10
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000				29,350,000	July	1887	5.00
24	Carbonate Hill, s. L.	Colo.	2,000,000	200,000	10	*				80,000	Apl.	1884	.05
25	Caribou Con., s.	Colo.	1,500,000	150,000	10	*				50,000	Mch	1880	.10
26	Castle Creek, G.	Idaho	100,000	100,000	1					51,000	Oct.	1883	.03
27	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*				270,000	May.	1884	.10
28	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,820,000	Feb.	1887	2.00
29	Christy, s.	Utah	10,000,000	100,000	100	*				10,000	Jun.	1885	.10
30	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
31	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*				241.375	Nov.	1887	.05
32	Cons. Cal. & Va., G. S.	Nev..	21,600,000	216,000	100	108,000	Jan.	1885	.20	1,252,000	Dec	1887	.50
33	Con. Gold Mining, G.	Ga..	500,000	100,000	5	*				108,000	Nov.	1883	.02
34	Contention, s.	Ariz.	12,500,000	250,000	50					†2,587,000	Dec.	1884	.25
35	Crescent, s. L. G.	Utah	15,000,000	600,000	25	‡				210,000	Aug.	1886	.05
36	Crown Point, G. S.	Nev..	10,000,000	100,000	100	2,675,000	Feb.	1882	.25	11,588,000	Jan.	1875	2.00
37	Daly, s. L.	Utah	3,000,000	150,000	20					375,000	Nov.	1887	.50
38	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*				†1,000,000	Nov.	1887	.10
39	Derbec B. Grav., G. S.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	180,000	May	1887	.10
40	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*				250,000	Oct	1887	.10
41	Elkhorn, G. S.	Mont	1,000,000	100.000	10	50,000	July	1883	.50	180,000	July	1887	.05
42	Empire Lt., G.	Mont	500,000	100,000	5					33.000	Mar	1887	.05
43	Eureka Con., G. S. L.	Nev..	5,000,000	50,000	100	600,000	July	1886	1.00	4,868,000	Dec	1887	.25
44	Evening Star, s. L.	Colo.	500,000	50,000	10	*				1,400,000	Nov	1883	.50
45	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	875.000	Oct.	1880	.25
46	Father de Smet, G.	Dak..	10,000,000	100 000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
47	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871		600,000	Jan.	1887	1.00
48	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*				190,000	July	1886	.10
49	Fresno Enterprise, G	Cal..	5,000,000	100,000	50		Mch	1883	.10	110,000	July	1882	.10
50	Garfield Lt., G. S.	Nev.	500,000	100,000	5					25,000	Mar.	1885	.12½
51	Gould & Curry, G. S.	Nev..	10,800,000	108,000	100	4,213,400	Nov.	1887	.50	3,826,000	Oct.	1870	10.00
52	Grand Central, s.	Ariz.	1,000,000	100,000	10					625,000	Dec.	1882	.25
53	Grand Prize, s.	Nev..	10,000,000	100,000	100	570,000	Apl.	1886	.50	495,000	Mar.	1884	.25
54	Granite, s.	Colo.	125,000	125,000	1					6,250	May	1883	.01
55	Granite Mountain, s.	Mont	10,000,000	400,000	25					3,600,000	Dec	1887	.50
56	Green Mountain, G.	Cal..	1,250,000	125,000	10	*				212,000	Nov.	1881	.07½
57	Hale & Norcross, G. S	Nev..	11,200,000	112,000	100	5,086,800	July	1887	.50	1,598,000	Apl.	1871	5.00
58	Hall-Anderson, G.	N. S.,	150,000	150,000	1					7,000	Jan.	1882	.05
59	Hecla Con., s. G. L. C.	Mont	1,500,000	30,000	50					1,077,000	Dec	1887	.50
60	Hel'a Mg & Red, G. S. L.	Mont	3,315,000	663,000	5					197,975	July	1886	.06
61	Holmes, s.	Nev..	10,000,000	100,000	100	300,000	Sept	1885	10	75,000	Apl.	1886	.25
62	Holyoke, G.	Idah.	200,000	200,000	1					27 000	Feb.	1883	.10
63	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	3,991,750	Dec	1887	.20
64	Honorine, s. L.	Utah	500,000	250,000	2	25,000	Jun.	1883		125,000	Sept	1887	.05
65	Hope, s.	Mont	1,000,000	100,000	10	*				183,252	Oct.	1887	.25
66	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*				4,000,000	Nov.	1884	.50
67	Idaho, G.	Cal..	310,000	3,100	100					4,539,500	Apl.	1887	5.00
68	Ideal, s. L.	Colo.	1,500,000	50,000	10					15,000	Oct.	1886	.05
69	Illinois, s.	N.M.	100,000	100,000	1	*				23,000	Jan	1887	.25
70	Independence, s.	Nev..	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
71	Indian Queen, s.	Nev..	250,000	125,000	2					388,750	July	1883	03
72	Invo, G.	Cal..	500,000	100,000	5	*				45,000	Apl.	1882	.05
73	Iron Hill, s.	Dak.	2,500,000	250,000	10	82,500	Oct.	1885		156.250	Nov.	1887	.07½
74	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*				2,100,000	Oct.	1887	.20
75	Jackson, G. S.	Nev.	5,000,000	50,000	100	10,000	Nov	1880	.20	45,000	Oct.	1886	.10
76	Jocusistita, s.	Mex.	2,500,000	250,000	10					1,200,000	Feb.	1885	.50
77	Jumbo, G.	Colo.	2,000,000	200,000	10					15.000	Jun.	1887	.02½
78	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881	.30	1,800,000	Dec.	1886	.10
79	La Plata, s. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept	1882	.30
80	Leadville Cons., s. L. L	Colo.	4,000,000	400,000	10	*				430,000	Apl.	1887	.05
81	Lexington, G. S.	Mont	4,000,000	40,000	100	*				565,000	Jan.	1885	2.00
82	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*				780,000	Mch	1885	.10
83	Little Pittsburg, s. L	Colo.	20,000,000	200,000	100	*				1,050,000	Mch.	1880	50
84	Manhattan, s.	Nev	5,000,000	50,000	100	35),000	Dec	1887	1.00	437,500	Feb	1886	.25
85	Marguerite, G.	Cal..	300,000	25,000	20					18,750	Oct.	1882	.25
86	Marion Bullion, G	N.C.	500,000							15.000	Jan.	1886	
87	Martin White, s.	Nev..	10,000,000	100,000	100	1,150,000	Mar.	1886	25	140.000	Dec.	1886	.25
88	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*				87,500	Sept	1887	5.00
89	Minnesota, C.	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1 00	1,826,000	Mar.	1876	
90	Mono, G.	Colo.	5,000,000	50,000	100	610,000	Sept	1887	.50	12.500	Mar.	1887	.05
91	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*				1,247,400	July	1887	.75
92	Morning Star, s. L.	Colo.	1,000,000	100,000	10					750,000	Nov.	1887	.2,
93	Moulton, s. G.	Mont	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
94	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
95	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	80,000	July	1885	.30
96	Napa, Q.	Cal..	700,000	100,000	7					200,000	Jan.	1885	.10
97	Navajo, G. S.	Nev..	10,000,000	100,000	100	450,000	Mar.	1887	30	325,000	Feb.	1885	.25
98	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06⅔
99	New York Hill, G.	Cal..	5,000,000	50,000	100	62,500	Oct.	1885	.15	215,000	Aug.	1882	.10
100	Northern Belle, s.	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.30	2,400,000	Apl.	1863	50
101	North Belle Isle, s.	Nev..	10,000,000	100,000	100	250,000	Mar.	1887	.50	30,000	Aug.	1881	.15
102	Ontario, s. L.	Utah	15,000,000	150,000	100					8,825,000	Dec.	1887	.50
103	Ophir, G. S.	Nev..	10,000,000	100,000	100	4,057,800	Aug	1887	.50	1,595,000	July	1882	1.00
104	Original, s. C.	Mont	1,500,000	60,000	25	*				129.000	Dec.	1887	.05
105	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,074,500	Dec	1887	1 00
106	Oxford, G.	N. S.	125,000	125,000	1	*				34,500	Oct.	1885	.02
107	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	47,000	Mar.	1882	.15	150,000	Apl.	1887	.10
108	Parrott, C.	Mont	1,800,000	180,000	10					54,000	Oct.	1887	.10
109	Peacock, S. G. C.	N.M.	2,000,000	200,000	10	*				60,000	Nov.	1886	
110	Pleasant Valley, G. S.	Cal..	10,000,000	100,000	100	10,000	Mar.	1881	.10	30,000	Dec.	1882	.05
111	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*				20.000	Feb.	1886	.10
112	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*				2,240,000	Jan.	1888	.40
113	Prussian, s. L.	Colo.	1,500,000	150,000	10					132,000	Jan.	1883	.10
114	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100					914,150	Aug.	1887	1.50
115	" com., Q.	Cal..	5,700,000	57,000	100					151,000	July	1882	.40
116	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		4,610,000	Aug.	1887	1.00
117	Ricamond, s. L.	Nev..	1,350,000	54,000	25	*				4,312,587	Jun.	1887	1.25
118	Ridge, C.	Mich.	500,000	20,000	25	220,000	Mar	1886	.50	100,000	Feb.	1880	.50
119	Rising Sun, s.	Dak..	750,000	150,000	5	*				52,000	May	1881	.07½
120	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
121	Robert E. Lee, s. L.	Colo	10,000,000	500,000	20					100,000	Dec.	1882	.50
122	Rooks, G.	Vt...	500,000	50,000	10	*				61,000	Apr	1885	.40
123	Savage, s.	Nev..	11,200,000	112,000	100	6,324,000	Sept	1887	50	4,460,000	July	1869	3.00
124	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*				50,000	July	1884	
125	Snoshone, G.	Idah.	150,000	150,000	1					7,500	Apl.	1883	.01
126	Sierra Buttes, G.	Cal..	225,000	22,500	10					1,477,245	Oct.	1887	.31¼
127	Sierra Grande, s.	N. M.	2,500,000	500,000	5					860,000	Sept	1884	.25
128	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	6,287,000	Dec.	1887	.25	102,000	Jan.	1871	1.00
129	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10					225,000	Nov.	1883	.25
130	Silver King, s.	Ariz.	10,000,000	100,000	100					2,000,000	July	1887	.25
131	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*				76,000	Nov.	1886	.02
132	Small Hopes Cons., s.	Colo.	5,000,000	250,000	20	*				3,112,500	Dec.	1887	.20
133	Smuggler, s. L.	Colo.	600,000	60,000	10					66,700	Aug.	1883	.25
134	Socorro, C.	N. M.	250,000	5,000	100					4,000	Mch	1882	.00¾
135	South Yuba, G.	Cal..	2,000,000	0 000	50	*				150,000	Oct.	1881	.75
136	Spring Valley, G.	Cal..	2,000,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1881	.25
137	Standard, G. S.	Cal..	10 000,000	1 0,000	100	25,000	Oct.	1884	.25	3,545,000	Dec.	1887	.10
138	Stormont, s.	Utah	500,000	500,000	1	*				155,000	Nov.	1881	.00
139	St. Joseph, L.	Mo..	1,500,000	150,000	10	*				844.000	Dec.	1887	.20
140	Surinam, G.	D. G.	3,000,000	2,0,000	5					105,000	Nov.	1887	.05
41	Syndicate, G.	Cal..	10,000,000	100,000	100	38,725	July	1882	.15	48,308	Sept	1885	.10
42	Tip Top, s.	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
43	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	Apl.	1882	.10
44	United Verde, C.	Ariz.	3,000,000	300,000	10	*				97.500	Feb.	1884	.20
45	Valencia, M.	N. H.	150,000	1,500	100	*				37,500	Apl	1886	2.50
46	Viola Lt., s. L.	Idah.	750,000	150,000	5	*				74,500	May	1887	.12½
47	Vizina, s.	Ariz..	5,000,000	200,000	25	*				140.000	Apl.	1882	.10
48	Yankee Girl	Colo.	2,500,000	250,000	10					1,087,500	July	1887	.10
49	Yellow Jacket, G. S.		12,000,000	120,000	100	5,448 000	Dec	1885	.75	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied.	Assessments. Date & am'nt of last,		
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*			
2	Albion, s. L.	Nev..	15,000,000	150,000	100	$577,000	July	1883	.25
3	Alloucz, C.	Mich	2,000,000	80,000	25	240,000	Feb	1884	
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	460,000	Aug.	1887	.50
5	Alta, s.	Nev..	10,080,000	100,800	100	2,074,400	Nov	1887	.50
6	Amador, G.	Cal..	400,000	200,000	2	*			
7	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.50
8	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
9	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
10	Aspen Mg. & S., s. L	Colo.	2,000,000	200,000	10	*			
11	Barcelona, G.	Nev..	5,000,000	200,000	25	*			
12	Rechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	Jan.	1883	.10
13	Belmont, s.	Nev..	5,000,000	50,000	100	735,000	Apl.	1886	.10
14	Best & Belcher, G. S.	Nev..	10,080,000	100,800	100	1,900,590	Aug.	1887	.50
15	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*			
16	Bi-Metallic, s.	Mon.	5,000,000	200,000	25	*			
17	Black Jack, G.	Cal..	250,000	100,000	2½				
18	Boston Con., G.	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Bradshaw, s.	Ariz.	2,250,000	225,000	10				
20	Brunswick, G.	Cal..	2,000 000	400,000	5	*			
21	Bullion, G. S.	Nev..	10,000,000	100,000	100	5,050,000	Aug.	1887	.50
22	Bye and Bye.	Ariz.	1,000,000	100,000	10	*			
23	Calaveras, G.	Cal..	500,000	500,000	1	*			
24	Carisa, G.	Wy	500,000	100,000	5	*			
25	Cashier, G. S.	Colo.	500,000	250,000	2	*			
26	Cen Contin'l, G. S. L.	C.&A	2,000,000	200,000	10	*			
27	Charles Dickens, G. S.	Idah.	1,250,000	250,000	5	*			
28	Cherokee, G.	Cal..	1,500,000	150,000	10				
29	Chollar, s.	Nev..	11,200,000	112,000	100	1,208,000	Dec.	1887	.50
30	Cinnamon Mt., G. S.	Colo.	750,000	150,000	5				
31	Climax, s. L.	Colo.	2,000,000	200,000	10	*			
32	Colorado No. 2, S. L.	Colo.	100,000	10,000	10	*			
33	Comstock, G. S.	Nev..	10,000,000	100,000	100	30,000	Mar.	1887	.15
34	Con. Imperial, G. S.	Nev..	5,000,000	50,000	100	1,175,000	Sept	1887	.2
35	Con. Pacific, G.	Cal..	6,000 000	60,000	100	183,000	Sept	1887	15
36	Cons Silver, s	Mo..	2,500,000	250,000	10				
37	**Cop. Queen Cons, C.	Ariz	1,400 000	140,000	10				
38	Courtlandt	Colo	500,000	50,000	10				
39	Crescent, s. L.	Colo.	3,000,000	300,000	10	*			
40	Crocker, s.	Ariz.	10,000,000	100,000	100	75,000	May	1887	.10
41	Crowell, G.	N. C.	500,000	500,000	1				
42	Dahlonega, G.	Ga..	250,000	250,000	1	*			
43	Dandy, s.	Colo.	5,000,000	500,000	10				
44	Dardanelles, G.	Cal..	1,000,000	100,000	10				
45	Decatur, s.	Colo.	1,500,000	300,000	5	*			
46	Denver City, S. L.	Colo.	5,000,000	500,000	10	*			
47	Denver Gold.	Colo.	300,000	60,000	5				
48	Deseret, G. S.	Utah	500,000	50,000	10	*			
49	Dunderberg, s.	Colo.	1,500,000	150,000	10	*			
50	Durango, G.	Colo.	500,000	500,000	1	*			
51	Eastern Dev. Co., Lt.	N. S.	1,500,000	150 000	10	990,000	Mar.	1886	1.00
52	El Cristo, G. S.	U.S.C	1,000,000	500,000	2				
53	El Dorado, G.	Cal.	1,000,000	250,000	4	*			
54	El Talento, G.	U.S.C	1,000,000	500,000	2				
55	Empire, s.	Utah	10,000,000	100,000	100				
56	Enterprise, s. L.	Colo.	800,000	80,000	10	*			
57	Eureka Tunnel, S. L.	Nev..	10,000,000	100,000	100				
58	Excnequer.	Nev..	10,000,00	100,000	100	880,000	July	1887	.20
59	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	6,000	Nov.	1887	.06
60	Gold Cup, s.	Colo.	500,000	500,000	1	*			
61	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
62	Gold Rock, G.	Cal.	1,000,000	500,000	2	*			
63	Goodsnaw, G.	Cal..	10,000,000	100,000	100				
64	Grand Belt, C.	Tex.	12,000,000	120,000	100				
65	Grand Duke.	Colo.	800,000	80,000	10				
66	Great Romance, G.	U.S.C	1,000,000	500,000	2	*			
67	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*			
68	Gregory Con., G.	Mon.	3,000,000	300,000	10				
69	Harlem M. & M. Co, G.	Cal..	1,000,00	200,000	5				
70	Head Cent. & Tr. s. G	Ariz.	10,000,000	100,000	100				
71	Hector, G.	Cal..	1,500,000	300,000	5				
72	Highland, C.	Mich	500,000	25,000	25				
73	Hortense, s.	Colo.	2,000,000	200,000	10				
74	Huron, C.	Mich	1,000,000	40,000	25	280,000	May	1887	3 00
75	Iron Gold & Silver, s	N. M.	2,000,000	200,000	10				
76	Iroquois, C.	Mich	1,250,000	50,000	25				
77	J. D. Reymert.	Ariz	10,000,000	100,000	100	*			
78	Julia Cons., G. S.	Nev..	11,000,000	110,000	100	1,452,000	Apl.	1887	.10
79	Kearsarge, C.	Mich	1 250,000	50,000	25	150,000	Oct.	1887	1.00
80	Laclede.	N. M.	2,000,000	200,000	10				
81	Lacrosse, G.	Colo.	1 000,000	100,000	10	*			
82	Lee Basin, s. L.	Colo.	5,000,000	500,000	10	*			
83	Lucerne, s.	Colo.	5,000,000	500,000	10	*			
84	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec.	1881	
85	Mariposa pref., G.	Cal..	5,000,000	50,000	100	1,687,500	Feb.	1883	.25
86	" common, G.	Cal..	10,000,000	100,000	100	1,975,000	Dec.	1881	.20
87	May Belle, G.	Cal..	10,000,000	100,000	100	84,000	Mar.	1884	.15
88	Mayflower Gravel..	Cal..	1 000,000	100,000	10	260,000	Nov.	1887	.25
89	Medora, G.	Dak.	25,000	250,000	1				
90	Mexican, s. S.	Nev..	10,000,000	100,000	100	2,615,960	July	1887	.25
91	Middle Bar G.	Cal.	400,000	200,000	2	*			
92	Mike & Starr, s. L.	Colo.	1,000,000	200,000	5	*			
93	Monitor, G.	Colo.	100,000	100,000	1	*			
94	Moose Silver, s.	Colo.	3,000,000	300,000	10	*			
95	Nachoochee, Lt., G.	Ga..	1,000,000	200,000	5				
96	Neath, G.	Colo.	1,000,000	100,000	10				
97	Nevada Queen, s.	Nev.	10,000,000	100,000	100	80,000	Mar	1887	.50
98	New Germany, G.	N. S.	100,000	100,000	1	*			
99	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*			
100	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov		
101	Noonday.	Cal..	600,000	60,000	10	208,000	Dec.	1881	.10
102	Oneida Chief, G.	Cal.	5 0,000	125,000	4	*			
103	Oriental.	Nev..	2,000,000	200,000	10				
104	Oriental & Miller, s.	Nev..	10,000,000	400,000	25				
105	Osceola, G.	Nev..	5,000,000	50,000	100	*			
106	Overman, G. S.	Nev.	11,520,000	115,200	100	3,765,680	Aug.	1887	.25
107	Park, s.	Utah	2,000,000	200,000	10				
108	Peer, s.	Ariz.	10,000,000	100,000	100	135,000	Nov.	1886	.10
109	Peerless, s.	Ariz.	10,000,000	100,000	100	320,000	Sept	1887	.25
110	Phœnix.	Ariz.	500,000	500,000	1				
111	Phœnix, G. S.	Ark.	5,000,000	200,000	25	*			
112	Phœnix Lead.	Colo.	100,000	100,000	1	*			
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NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Dec. 17.		Dec. 19.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon													
Argenta, Nev													
Bassick, Colo													
Belcher, Nev													
Belle Isle, Nev													
Bodie Cons., Cal	3.25	3.15	3.25	3.15	3 20	3.00			2.25				1,970
Breece, Colo													
Bulwer, Cal													
Calumet & Hecla											190		20
Challar, Nev			6.50										100
Chrysolite, Colo			.40		.50								550
Colorado Cent'l, Colo													
Cons. Cal. & Va., Nev	21.00	20.25	21.00		23.38		21.00		21.25	21.00	21.75		1,100
Crown Point, Nev							7.87						100
Deadwood, Dak	1.90	1.70	1 90	1.80									400
Dunkin, Colo											.75		100
Eclipse, Colo	2.00	1.88									2.00		400
Eureka Cons., Nev					6.00						5.50		230
Father de Smet, Dak													
Freeland, Colo													
Gold Stripe, Cal													
Gould & Curry, Nev	5.13						4.90		4.50		4.75		500
Green Mountain, Cal													
Hale & Norcross, Nev	8.13										8.75		250
Helena, Mont													
Holyoke, Idaho			.08		.08				.07		.07	.06	3,600
Homestake, Dak			11.00		11.50				12.00		12.00		260
Horn-Silver, Ut	.90	.80	.85		.90		.80						900
Independence, Nev													
Iron Hill, Dak			.90				.90						300
Iron Silver, Colo					2.80		2.80	2.75			2.85		1,050
Leadville C., Colo			.28	.27	.25								600
Little Chief, Colo													
Little Pittsburg, Colo													
Martin White, Nev													
Mono, Cal									1.40				400
Mount Diablo, Nev													
Navajo, Nev													
North Belle Isle, Nev									7.75				100
Ontario, Ut			27.00						27.00				80
Ophir, Nev	10.38		10.75								9.25		500
Plymouth, Cal	19 00						19.25		19.38		19.25	19.13	180
Quicksilver Pref., Cal									33 50				100
" Com., Cal									9.75		9.75		700
Quincy											59.50		40
Robinson Cons., Colo			.40				.40		.40				1,000
Savage, Nev					7.88								100
Sierra Nevada, Nev													
Silver King, Ariz	4 75												100
Standard, Cal							2.25	2.20			2.26		500
Stormont, Ut													
Yellow Jacket, Nev			6.50										100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Dec. 17.		Dec. 19.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez											1.25		200
Amador, Cal	1.70		1.70		1.75		1.75		1.75	1.70	1.75	1.65	2,500
American Flag													
Barcelona, Nev			.45										100
Bechtel Con., Nev													
Best & B'lcher, Nev											6.25		200
Brunswick	1.65		1.65	1.50	1.65	1.60	1 65		1.60	1 55	1.60		3,130
Bullion			2.70										100
Carupano	1.85		2.10	2.00							2.15	2.10	800
Cashier	.28										.28	.25	1,200
Castle Creek, Id	.11	.10			.08		.08	.05	.06				3,500
Central, Ariz							09						500
Commonwealth									2.75				200
Con. Imperial													
Con. Pacific													
Decatur													
El Cristo, U. S. Col	2.10	2.00	2.00	1.90	2.10	2.00	2 10		2.20	2.00	2.50	2.10	3,450
Exchequer	2.05		1.95						1 80		1.80		400
Found Treasure													
Hector													
Julia, Nev													2,700
Kossuth	.08		.10						.15		.15		4,500
Lacrosse, Colo	.13	.12			.11	.10	.10				.11		100
Mexican, Nev											5.38		4,400
Middle Bar, Cal	.30		.29		.29		.29		.29		29		2,200
Monitor									12		.12		
New Pittab'g, Colo													
North Stand'd, Cal													
N. Horn-Silv'r, Ut													
Oneida Chief													
Ori'nt'l & Mil'r, Nev													500
Phœnix of Arkan's	.75				.80								
Potosi													32,900
Proulette			1.55	1.00	1.60	1.25	1 60	1.45	1.85	1.55	1.85	1.80	2,100
Rappanann'k, Va	.19		.18		.19				.19		.19		
Red Elephant, Colo													
Renfrew, N. S													
Saint Kevin, Colo													810
San Sebastian	3 25		3.25		3.25		3.25		3.25		3.20		
Santiago, U. S. Col													700
Security, Colo			.90		.90	.85	.88		.90				
Silver Cliff, Colo													
Silver Hill													
Silver Queen, Ariz													
Stanislaus, Cal													
State L'e, 1&4, Nev													
" Nos. 2 & 3, Nev													35,400
Sutro Tunnel, Nev	.22	.20	.22	.20	.22		.22	.20	.21	.18	.19	.14	2,000
Taylor Plumas, Cal					.02								400
Tornado	1.00		1.00										
Union Cons., Nev													
Utah													

*Dealt in at the New York Stock Exchange. Unlisted Securities

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Dec. 16.		Dec. 17.		Dec. 19.		Dec. 20.		Dec. 21.		Dec. 22.		SALES.
Atlantic, Mich	13.25	13.00	13.00		13.00						13.00		310
Bodie, Cal													
Bonanza D	1.50	1.25	1.50	1.44	1.94	1 50	1.63	1.44	1.44		1.50		5,925
Boston & Mont													
Breece, Colo	.30						35						1,000
Calumet & Hecla, Mich	190	189	189¾	185¼	190		195		196				156
Catalpa, Colo	.30	.26	.30		.35	32½	.35	.30	.30		32½		5,400
Central													
Dunkin, Colo			1.00		1.00		97½				1.00		300
Enterprise													
Eureka, Nev													
Franklin, Mich	15.88	15.50	15.75	15.50	15.50	15.00	14.00	13.50	13.75	13.38	14.12	13 75	2,715
Freeland, Colo													
Hale & Norcross													
Ironton Iron Co., Mich													
Kearsarge	5.75				5 75	5⅝	6.00	5.50			5 50	5.25	660
Little Chief													
Napa, Cal			1.75		1.75		1.75		1.50				1,050
Osceola, Mich	24 00	22.88	23.00	22.50	22 88		23.00	21.50	21.85		21.25	21.00	1,203
Pewabic, Mich									2 50		2.50		200
Quincy, Mich	63.00	62.50	62.50	59.00	60.00		60.00	59.00	60.00	59.00			492
Reace													
Ridge, Mich			1.38	1.00	1.00								175
Robinson, Colo													
Sierra, Nev													
Silver King											5.00		100
Standard											1.98		100

NAME OF COMPANY.	Dec. 16.		Dec. 17.		Dec. 19.		Dec. 20.		Dec. 21.		Dec. 22.		SALES.
Allouez, Mich			1.88	1.75	1.75		1.63	1.50	1.50		1.50		1,300
Arnold, Mich	62½	60	62½	55			60		50				1,050
Aztec	35		30		25								450
Bowman Silv'r, Nev	05												1,000
Brunswi'k	1,60		1.60						1.65	1.60	1.60		900
Canada													
Contentment													
Crescent, Colo					20	17	20		20	18	17½		4,600
Cusi, N. Mex	15				15				14				500
Empire													
Hungarian					30				30				200
Huron, Mich											5.00		200
Kossuth													
Mesnard									45				200
National, Mich	3.88	3.00											250
Native					40	30	20						1,400
Oriental & M., Nev													
Pontiac			45		45								300
Rappahannock, Va			18		18				18		18		1,800
Security, Colo	1.00		90		1.00		85				85		500
South Side	50		50		45								600
St. Louis													
Star	65												1,100
Sutro Tunnel, Nev	22		22		22				21				1,100
Tamarack	112		112		119		123	119	125	124	125	124	563
Washington	62½												300
Winthrop									30				100

New York: Dividend shares sold, 16,780. Non-dividend shares sold, 104,990 Total New York, 121,270.
Boston: Dividend shares sold, 19,836. Non-dividend shares sold, 19,713. Total Boston, 39,549.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Dec. 17.		Dec. 19.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Cameron Coal	100													
Ches. & O. RR	100													
*Chic. & Ind. Coal RR	100													
Do. pref	100													
Col. & Hocking Coal	100	28	26¼	28	26¾	27¾		27⅞	27¼	28½	27½	28	26½	3,400
Col., C. & I	100	35	34⅞			35				36	35¼			600
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100			103	102¼	102¾	102⅝	103	102¼	103	102⅝	103	102⅞	2,202
D., L. & W. RR	50	127½	126½	127⅛	126⅛	126½	125⅞	126⅞	126¼	127⅛	126½	128⅛	126⅜	92,300
Elk Lick Coal Co														
Hocking Valley	100					24	22¾	24½	24¼	25⅞	24¾	26¾	25½	4,995
Lehigh C. & N.†	50			46¾		47	46⅜			47	46⅞			672
Lehigh Valley RR.†	50	55		55	54	54½	54			54⅜				415
L. & W. C. & I. Co														
Marshall Con. Coal	100													
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50													
New Central Coal	100													
N. J. C. RR	100	74⅞	74½	74⅜	73¾	73⅞				74½	74	75	74¾	1,650
N. Y. & S. Coal	50													
N. Y., Susq. & Western	100							83⅜		83¾		81½		360
Do. pref	100			27½		28		28		28		29	28⅜	1,005
N. Y. & Perry C. & I	100													
Norfolk & Western R R	100					14⅜	14¾	14¾						300
Do. pref	100	41	40¾	41	40	40⅜	40	40¾	40½	41¼	41	41		2,465
Penn. Coal	50													
Penn. RR.†	50	54⅜	54⅛	54⅝	54⅜	54⅜	54⅛	54⅜	55¼	54⅜	54¼			1,911
Ph. & R. RR.**	50	66¼	65⅞	66⅝	65	65⅝	64¾	65⅞	65¼	66¼	64¾	66	64⅝	266,759
Spring Mountain	50													
Tennessee C. & I. Co	100	27		27¾	27	27¼				28½	28			600
Westmoreland Coal†	100									4½				30
White breast Fuel Co		88¼				88½	88⅜			88½				400

** Of the sales of this stock, 42,599 were in Philadelphia, and 224,160 in New York.
† The quotations for these stock are not net percentage, but actual price.
Dealt in at the New York Stocks Exchange Unlisted Securities.

Total sales, 380,064

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Dec. 16.	Dec. 17.	Dec. 19.	Dec. 20.	Dec. 21.	Dec. 22
Alpha						
Alta	2.10	2.10	2.05	1.45	1.15	1.40
Argenta						
Belcher						
Belle Isle	½	½	½	½	.40	.45
Best & Bel	6⅞	6¾	7⅝	5⅞	5	5⅜
Bodie	3.40	3.40	3.30	2.70	2¼	2.55
Bulwer		.90	.90	¾	.70	.70
Challar	5.78½	5.78½	6½	5⅝	4½	5¼
Com'nwealth	3 05	3.05	2.95	2.70	2.60	2.95
Con. C. & V	20¼	20¼	23⅛	20¼	18⅛	20
Con. Pac						
Crown Pt	9¼	9¼	8⅞	7¼	6⅜	7
Eureka C	6	6	5¾			
Gould & C	5½	5½	5⅝	4¾	4.05	4¼
Hale & N	8	8	8¾	7⅛	7¼	8
M. White						
Mexican	5½	5½	6	4 95	4½	4.60
Mono	2¼	2¼	2.05	1.70	1.45	1½
Mt. Diablo	1	1	95	90	90	85
Navajo	2.65	2 65	2½		2.20	2.20
Nev. Queen	7½	7½	7¾	7¼	7⅛	7⅜
N. Belle I	10	10	10½	8¾	7⅝	8⅞
Ophir	5⅝	5⅝	6⅛	4.95	4.35	4.95
Potosi	7¼	7¼	8	6¼	6⅛	6⅞
Savage						
Scorpion	5	5	5⅜	4.30	4.05	4
Sierra Nev						
Sutro Tun						
Tip Top	4.80	4.80	5¼	4.40	4.05	4
Union Con	1 85	1.85	1.90	1½	1.20	1.40
Utah	6½	6¼	6⅝	5⅜	4.60	4¾
Yellow Jkt						

steel is active in a small way and the consumption seems to be maintained at a maximum point. There is a very good feeling throughout the Eastern Pennsylvania iron trade and threatened tariff agitations do not seem to have much effect. The structural iron makers are all fairly busy. Nearly all the mills will shut down on Friday or Saturday for the holidays. Nothing new has been done in the steel rail trade and prices remain where they were. Makers say there will be a large amount of business transacted during January and things look that way. Old rails are dull at appended quotations.

FINANCIAL.

NEW YORK, Friday Evening, Dec. 23.

The Condition of Trade.

As is customary at this season of the year, the wholesale distribution of merchandise has slackened materially. The advent of cold weather has gone far to stimulate retail trade in Christmas goods and other lines, and manufacturers, jobbers and commission merchants are busily employed in stock-taking or arranging for next year's trade.

The volume of general business for the month of December is admitted to compare favorably with the like total for 1886, with the possible exception of the iron industry, while the aggregate for 1887 is materially in excess of 1886. The reports of railway earnings for the current year, on the whole, remain very favorable, as compared with 1886, 1885 and 1884, and the striking fact comes to the front that the railway companies are finding no fault with the workings of the Inter-State Commerce law. The reports of bank clearings, while not making a specially favorable exhibit this month as compared with December 1886, promise a total for 1887, as compared with 1886, pointing to a fair increase this year over last. Just what proportion of the bank clearings is due to purely speculative transactions on the various stock and produce exchanges, may not be definitely or entirely satisfactorily determined, which preveuts a full and clear comparison of one year's total with another, as a gauge of what is commonly referred to as legitimate or strictly distributive trade; yet the bank clearings are, in a sense, fair measures of commercial activity, and as such, until more complete and subjected to more rigid analysis, must continue of value in reporting on the volume of trade.

Leading staples markets may be briefly characterized as follows: Wheat is irregular, but moderately firm on large foreign takings; cotton slightly firmer; corn and oats (and hogs and hog products as dependent upon corn) are high and firm. The ardent speculation (French syndicate) in copper, tin and lead continues, with higher quotations and the New York Metal Exchange, with something of a spirit of enterprise, has enlarged its facilities for gratifying the desire of speculators in copper and copper stocks.

Cotton goods are firm, with an upward tendency, perhaps the strongest staple as to price prospects in the list, excluding those in which there are regularly organized speculative dealings; and woollens are firm and promise to maintain their present level.

The American iron market continues quite unsatisfactory to makers and agents. No price has been made yet for best grade Eastern irons, the old year quotations being thus unusually prolonged. Consumers seem to be averse to ordering freely for next year's delivery, and frankly avow a belief that quotations may be shaded. One of the more serious reasons advanced for such an opinion lies in the alleged inability of the West to consume, in addition to their pig-iron production, the surplus Southern pig output offering for 1888 delivery in the West. This statement, backed by the expectation of an increased capacity for producing pig-iron at the South early in the coming year, has suggested the likelihood of Southern iron coming this way again in relatively large quantities. The stoppage of several large steel mills, throwing several thousand employés out of work, so far as can be learned, after some special inquiry, appears to be due to an absence of orders for rails sufficient to make it profitable to continue manufacturing right through the holidays.

The condition of the anthracite coal trade continues quite favorable from the point of view of the producer. The demand is heavy, the prices are considerably higher than they were a year ago, and the long delay of cold weather in making its appearance points to a prolonged cold winter from this time onward. The outlook for the striking Lehigh coal miners is not bright, as some of their contributing brother miners (in adjoining districts) have stopped contributing to their support. No definite explanation has been given or hinted at as to the probable action of the Reading Company in reference to the 8½ per cent higher wages paid its coal miners after January 1st. In Kansas and Nebraska great suffering and some loss of life has been caused by scarcity of coal owing to the intense cold.

Scarcity of cars to transport coal is alleged to be the prime reason of the scarcity of fuel at outlying points.

The New York money market continues nominally closer for time loans, owing to the desire of the banks to hoard their funds for the January corporation disbursements. There is also rather more reticence on the part of banks, West and East to hold on to their currency.

Rates tend upward, but have moved in only a few instances.

The Coal Road Stocks.

The stock market in Wall street has been very uninteresting, no one but the cliques doing any business. It is believed that Reading and Lackawanna have been jackscrewed up of late by parties in interest, and that having unloaded large blocks at the higher quotations, that the support given those stocks has, to a large extent, been withdrawn. The market has been very unsatisfactory to most outsiders for some time, and there is likely to be little doing for some time to come. Lackawanna remains unchanged on the week; Reading has declined ½; Delaware & Hudson has increased 1¼ points, and Jersey Central ¼ point. Foreign exchange is higher at $4.86@$4.86¼.

Bonds Nos. 35, 37, 54, 55, 76, 123, 205 213, and 218, for $1,000 each, issued by the Maryland Coal Company, were drawn for the sinking fund on the 19th inst., and will be paid on presentation at the office of the Farmers' Loan & Trust Company, 20 and 22 William street, New York. Interest thereon will cease on the 29th inst.

Mining Stocks.

Mining shares during the past week have been extremely dull, and the approaching holidays have limited business to a very small point, very little interest being taken in the proceedings throughout, especially as the San Francisco market has been irregular and the tendency lower.

The stock of the Prouslite Mining Company, of Idaho, was called for the first time on Monday, the first sale being made at $1. The stock has attracted considerable attention, and the manipulators managed to bring up the price to $1.85, at which it was selling to-day. The sales for the week amounted to 32,900 shares.

It is scarcely necessary to state that this remarkable gain in values was accomplished simply by the washing process. When any stock shows such a very rapid rise as this it behooves the public to proceed with caution, regardless of the intrinsic value of the shares. This method of dealing accounts for the apparently large trading. Each day since the stock was called, a reference to the weekly transactions reveals the fact that almost one-half of each day's demand was confined to this particular stock.

The suit brought by the Tortilita managers against the New York *Herald*, as already mentioned in our last issue, is looked upon in Wall street as a barefaced attempt to bolster up the scheme and enable the promoters to float their worthless stock and to prevent stockholders from taking legal measures to recover their money. Meanwhile the explanation promised to the Consolidated Exchange, by President Reall, as to the condition of the property is still withheld No one should be deceived by the advocacy of this precious concern by the STAR.

El Cristo received more attention this week. The opening prices were from $1.90@$2.10. To-day the stock advanced to $2.50. The transactions amounted to 3450 shares.

Sutro Tunnel, which has been firm all week at from 20c. to 22c., declined to 14c. to-day in consequence of the announcement that the company has not been successful so far in receiving sufficient subscriptions for the new bonds for settling the litigation under the existing agreement, which expires on December 31st next. The shareholders are now notified that it is propoposed to take an assignment of the present mortgage and foreclose it for the sole benefit of subscribers for the new bonds. It is said that many leading bankers, brokers and capitalists have already subscribed for these bonds. Subscriptions will continue to be received at the Union Trust Company until December 30th. If the shareholders do not respond promptly, their interest in the property will be extinguished.

Consolidated California & Virginia advanced from $21 to $23.38 on Tuesday, but has since again declined to $21, selling to-day at $21.75. Hale & Norcross is quiet, selling at from $8.13 to $8.75. The prospects from the mine are reported as favorable. Yellow Jacket shows a sale at $6.50. Savage at $7.88. Ophir declined from $10.75 to $9.25. Gould & Curry from $5.13 to $4.50. Chollar sold at $6.50. Best & Belcher at $6.25. Exchequer declined from $2.05 to $1.80.

A few sales of Eureka were made at from $6.00 to $5.50.

North Belle Isle shows a sale of $7.75; Tornado, a few at $1.00; Commonwealth, one of the Tuscarora group, appeared on Thursday at $2.75.

Silver King shows but one sale at $4.75.

The Board of Managers of the New York Metal Exchange held a special meeting on the 21st inst., and decided to list copper stocks and ordered a daily call. The following stocks were at once placed on the list: Allouez, Arnold, Calumet & Hecla, Centrel, Dana, Franklin, Huron, Hanover, Kearsarge, Minnesota, National, Osceola, Pewabic, Phœnix, Quincy, Rockland, South Side, Star, Tamarack, Washington, and Winthrop. The daily call will begin after the first day of January. Regarding the listing of other stocks besides those named, it was decided to appoint a committee, which will examine the stocks proposed. The following rules have been adopted to take effect January 3d, 1888. The news that a syndicate variously described as the "great French," "American," and "English," had begun to buy all copper mining stocks loose on the market at Boston, caused some commotion in New York. It was stated that the syndicate was especially hankering after Tamarack, which made another advance.

Rule I.—There shall be a daily call of copper mining stocks at 12 o'clock noon each day, at which only such stocks shall be called as may be designated by the Board.

Rule II.—The call shall be conducted under the provisions of Copper Rule 3, with the exception that no delivery except spot shall be dealt in at the call, that all bids and offers shall be for 100 shares or the multiple thereof, and that the minimum differences to be recognized shall be $\frac{1}{100}$ths of one per cent on stocks selling at $1 or less per share, and on stocks selling at over $1 per share, $\frac{1}{10}$th of one per cent.

Rule III.—Section 1. Deliveries shall be in all cases by certificate and irrevocable power in the name of, or guaranteed by a member of this exchange.

Sec. 2. Deliveries on "cash" sales shall be made on the day of sale, by or before 2 P.M. On spot (or "regular") the delivery shall be made by or before 1:30 P.M. of the next business day, without notice; and on time sales for delivery at buyer's or seller's option, one day's notice of intention to demand or tender delivery shall be given, and the tender made and taken by or before 1:30 P.M. of the next business day.

SEC. 3. In case of failure to receive or deliver stock when due, written notice of the failure shall at once be given to the secretary or his temporary deputy, who shall thereupon publicly buy in or sell out the stock (as the case may be) for account of the party in default; and any loss resulting from such purchase or sale shall be paid by the party in default.

SEC. 4. All deliveries shall be made on certificates of not over 100 shares each.

Rule IV.—Time contracts for more than three days' future delivery shall bear interest at the rate of six per cent per annum, and either party to such a contract shall have the right to require deposit of margin at the following rates, the deposit to be made and kept good in the same manner as provided in Copper Rule 8: On all stocks sold for $50 per share or more, $10 per share; between $25 and $50 per share, 20 per cent of the price of sale; from $15 to $25 per share, $5 per share; under $15 per share, 30 per cent of the price of sale.

Rule V.—No sales of stocks shall be recognized or enforced by any officer or committee of the Exchange, unless the transaction is made upon the floor, between the hours of 10 A.M. and 3 P.M., and duly recorded on the books of the Exchange.

Rule VI.—When a contract for future delivery at fixed time falls due on Sunday or a holiday, delivery shall be made on the preceding day: except that when two holidays (or Sunday and a holiday) occur on consecutive days, contracts maturing on the second of such days shall be due on the following business day. No contracts shall be made to run over a longer period than 60 days

Copper Rule 3, referred to above, is the one which defines the technical manner in which the daily call shall proceed. Rule 8 specifies the usual condition of margin deposits; requiring that certified checks, drawn to the order of the bank designated as depository, shall be sent to the Secretary of the Exchange before 2:45 P.M. when the demand is made before noon, or before 11 A.M. of the next day if called for after 12 M. Certificates for such deposits are issued by the bank, made payable to whichever party to the contract that the secretary may direct; the escretary acting only under joint instruction of both parties.

The copper stocks have also been listed at the Consolidated Stock and Petroleum Exchange. Calumet & Hecla was called at $190; Quincy at $59.50; Allouez at $1.25.

The passing of the usual monthly dividend of the Deadwood-Terra Mining Company has brought a further decline, the stock selling as low as $1.70. Homestake advanced from $11 to $12. Iron Hill has also sold lower in consequence of the non-appearance of its divvy—the price ruling at 90c.

Rappahannock is neglected; a few sales were made at 18@19c.

Phoenix of Arkansas is neglected, selling at from 75 to 80c.

San Sebastian receives some attention at prices ranging from $3.20 to $3.25. Carupano advanced from $1.85 to $2.15.

Castle Creek took a sudden drop from 11 to 5c. Holyoke was in sympathy with it and sold at from 8 to 6c.

The Quicksilver boom has apparently collapsed. Preferred shows but one sale at $33.50, and Common a few at $9.75.

Brunswick holds its own at from $1.50 to $1.65.

Plymouth Consolidated records several sales at from $19@$19.38.

Middle Bar and Amador are quiet, the former selling at from 29@30c., and the latter from $1.70@$1.75.

Bodie Consolidated, which advanced to $3.25 last week, opened at that price, but declined to $2.25 on Thursday. Standard was quiet, at from $2.20@$2.25. Mono shows one sale at $1.40.

Eclipse, one of the "new comers," was neglected, the manipulators using but little effort to attract attention to the stock, which opened at $1.88 and advanced to $2, with sales of 400 shares. Cashier is resting, only 1200 shares changing hands at from 25c. to 28c. Security did not reach the dollar mark, the price ranging from 85c. to 90c. Monitor shows sales at 12c. Robinson Conaolidated at 40c. Leadville at from 25c. to 28c. Iron Silver records an unusual business, the transactions amounting to 1050 shares, at from $2.75 to $2.85. Chrysolite was quoted at from 40c. to 50c.

Auction Sale of Stocks.

The following securities were sold at auction in this city on the 21st inst.: $2000 Central Trust Co. certificate for Central RR. Co. of New Jersey general mortgage bonds, 100; $100 Central Trust Co. certificate for Central RR. of New Jersey general mortgage bond scrip, 97; 20 shares New York, Lake Erie & Western RR. Co., preferred, 61¼; $60 New York, Lake Erie & Western RR. Co. income bonds certificate, $31; 1200 shares Dakota Water Power Co., 1@2¼; 10 shares Colwell Lead Co., $100 per share;

$1000 Central RR. of New Jersey first-mortgage 7 per cent consolidated bond, 111; 46,500 shares the Belle of Ouray Silver Mining Co. of Colorado, $20 lot.

Meetings.

Annual and special meetings of the following companies will be held at the dates given:

Big Bend Hydraulic Company, No. 181 Broadway, New York City, January 10th, at eleven o'clock A.M.

Bonaparte Hill Gold and Silver Mining Company, No. 265 Broadway, room 27, New York City, January 4th, at twelve o'clock M.

Cambria Iron Company, No. 218 South Fourth street, Philadelphia, Pa., January 17th, at four o'clock P.M.

Combination of the Peer, Peerless and Weldon mining companies, Room 26, Nevada Block, No. 309 Montgomery street, San Francisco, Cal., December 29th, at one o'clock P.M.

Genesee Mining Company, No. 306 Pine street, room 4, San Francisco, Cal., January 10th, at one o'clock P.M. Special meeting for the purpose of electing trustees and selling the company's property situated in the Devil's Gate district, Lyon County, Nevada.

Hanover Mining Company, No. 70 Devonshire street, Boston, Mass., January 7th. Special meeting for the purpose of considering the advisability of increasing the capital stock ot the company to one million dollars.

Monongahela Navigation Company, No. 104 Grant street, Pittsburg, Pa., January 12th, at 2 o'clock P.M.

Osceola Gravel Mining Company, Salt Lake City, Utah, January 3d, at eleven o'clock A.M. Special meeting to consider and vote upon a resolution to ratify and confirm certain acts of the board of directors in relation to the disposition of a portion of the capital stock for working purposes, and such other business as may properly come before the meeting.

Pennsylvania Oil Creek Petroleum Company, Room 13, No. 727 Walnut street, Philadelphia, Pa., January 10th, at half-past three o'clock P.M.

Reading Iron Works, Philadelphia, Pa., February 20th, at one o'clock P.M. An election of stockholders of said corporation will be taken for or against an increase of indebtedness to an amount not exceeding six hundred thousand dollars. The object is to get authority to issue a new loan, secured by first mortgage, to take up the mortage of the company maturing January 1st, 1889.

Republic Iron Company, No. 25 Wade Building, Cleveland, O., January 18th, at ten o'clock A.M.

Royal Iron Company, office of the Iron Bay Manufacturing Company, Marquette, Mich., January 10th, at two o'clock P.M.

Dividends.

Columbia Oil Company has declared a dividend, No. 58, of two per cent, payable forthwith at Pittsburg, Pa.

Denver & Rio Grande Railroad has declared a cash dividend on the preferred stock of one and one quarter per cent, payable January 12th, and a scrip dividend of one and one quarter per cent, bearing interest at the rate of five per cent, redeemable at the pleasure of the company.

Excelsior Brick and Stone Company has declared a dividend of five per cent, payable January 6th, at No. 423 Walnut street, Philadelphia, Pa.

Franklin Mining Company, of Michigan, has declared a dividend of one dollar per share, or $40,000, payable January 1st.

Homestake Mining Company, of Dakota, has declared dividend No. 113, of twenty cents per share, or $25,000, payable December 24th, at Messrs. Lounsbery & Co.'s, No. 15 Broad street, New York City.

Ontario Silver Mining Company, of Utah, has declared dividend No. 139, of fifty cents per share, or $75,000, payable December 31st, at Messrs. Lounsbery & Co.'s, No. 15 Broad street, New York City.

Original Mining Company, of Montana, has declared a dividend, No. 39, of five cents per share, or $3000, payable on December 20th, at Butte, Montana.

Penn Gas Coal Company, of Pennsylvania, has declared a quarterly dividend of one and one half per cent, payable December 29th.

Philadelphia (Natural Gas) Company, of Pennsylvania, has declared dividend No. 26, of one per cent, or $75,000, payable December 25th, at No. 935 Penn avenue, Pittsburg, Pa.

Small Hopes Consolidated Mining Company, of Colorado, has declared dividend No. 60, of twenty cents per share, or $50,000, payable December 29th.

Westmoreland & Cambria Natural Gas Company has declared a quarterly dividend, No. 4, of two and one-half per cent, payable January 2d, at No. 43 Sixth avenue, Pittsburg, Pa.

Pipe Line Certificates.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Dec. 17	78⅝c.	79⅛c.	78⅝c.	79⅛c.	1,851,000
19	79⅛	81⅞	79¼	81¾	4,352,000
20	81¾	82⅜	80⅛	81	4,485,000
21	80¾	81⅞	80⅜	81¼	2,546,000
22	81⅛	81⅛	80⅜	80¾	1,560,000
23	81¼	82⅜	80⅞	82⅛	1,979,000
Total sales in barrels					16,773,000

St. Louis Mining Stocks. Dec. 21.

[From our Special Correspondent.]

The dullness incident to the holidays has set in, and our market is lifeless, and likely to remain so for the balance of the year. West granite, which absorbed the attention of brokers for the past two weeks, has tended downward, closing at about 85c., as against $1.20 at the close of last week. All other stocks have been neglected. Quotations will be found on another page.

Assessments.

Company.	No.	When levied.	D'l'nq't in office.	Day of sale.	Am'nt per share.
Alta, Nev	36	Nov. 29	Jan. 3	Jan. 23	.50
Anchor, Utah	..	Dec. 13	Jan. 13	Feb. 13	.20
Bannock, Idaho	..	Oct. 22	*Dec 12	*Dec 29	.25
Bellevue-Idaho, Id	..	Nov. 15	Dec. 21	Jan. 10	.25
Belle Isle, Nev	11	Dec. 14	Jan. 17	Feb. 7	.15
Bryant, Alaska	5	Sept. 20	Nov. 17	Dec 31	.01½
Canadian, Mich	..	Nov	Dec. 12	.....	.05
Chicago M. & M. Co.	..	Nov. 9	Dec. 11	Jan. 10	.10
Chollar, Nev	24	Dec. 5	Jan 10	Jan. 31	.50
Czar, Alaska	5	Sept. 20	Nov. 17	Dec. 31	.01½
Eldorado, Dak	2	Dec. 14	Jan. 14	Jan. 31	.01
Elk Mt., Dak	4	Nov. 8	Dec. 8	Dec. 28	.00²½
Emerson, Utah	.	Dec. 10	Jan. 20	Feb. 9	.01
Far West, Dak	13	Dec. 13	Jan. 14	Feb. 4	.01
Felice, Ariz	1	Nov. 11	Dec. 17	Jan. 9	.20
Fisher, Ariz	1	Nov. 11	Dec. 17	Jan. 9	.20
Florence, Dak	2	Nov. 1	*Dec 15	*Dec 30	.001½
Found Treasure, Nev	1	Nov. 5	Dec. 10	Dec. 30	.06
Galena S. & R., Dak	1	Nov. 16	Dec. 30	Jan. 20	.10
Gen. Miller, Alaska	5	Sept. 20	Nov. 17	Dec. 13	.01½
Golden Fleece, Cal	11	Oct. 15	Dec. 7	Jan. 4	10.00
Gould & Curry, Nev	57	Oct. 28	Dec. 2	Dec. 27	.50
Gray Eagle, Cal	4	Nov. 17	Dec. 22	Jan 12	.01
Heath, Idaho	2	Nov. 4	Dec. 10	Dec 30	.05
Hot Spur, Dak	4	Dec. 10	Jan. 16	Feb. 4	.002
Jamestown, Alaska	5	Sept. 20	Nov 17	Dec. 31	.01½
Jeanette, Alaska	5	Sept. 20	Nov. 17	Dec. 31	.01½
Kossuth, Nev	9	Nov. 25	Jan. 5	Feb. 6	.10
Manhattan, Nev	7	Dec. 9	Jan. 12	Jan. 31	1.00
Maryland, Alaska	5	Sept. 20	Nov. 17	Dec. 31	.01½
Mayflower, Cal	39	Nov. 23	Dec. 30	Jan. 18	.25
Monarch, Dak	..	.....	Dec. 8	Dec. 24	.02
Morgan, Cal	12	Nov 26	Dec. 31	Jan. 24	.15
Mountain, Cal	26	Nov. 14	Dec. 16	Jan. 4	.01
New Coso, Cal	21	Oct. 19	Dec. 1	Dec. 26	.10
North Banner, Cal	20	Nov. 18	Dec. 20	Jan. 7	.01
Occidental Con., Nev	1	Dec. 12	Jan. 16	F. b. 8	.25
Oxford, Dak	1	Nov. 5	Dec. 6	Dec. 26	.01¼
Packer Lake, Cal	3	Nov 21	Dec. 19	Jan. 2	.001¼
Pocahontas, Dak	5	Nov. 15	Dec 17	Jan. 3	.005
Potosi, Nev	29	Nov. 30	Jan. 5	Jan. 26	.50
Rattler-Gilroy, Dak	..	..	Dec. 8	Dec. 27	.01½
Ruby Bell, Dak	4	Dec. 13	Jan. 14	Jan. 31	.00²½
Rubicon, Dak	2	Nov. 23	Dec. 27	Jan. 20	.002
Sierra Nevada, Nev	90	Dec. 7	Jan. 11	Jan. 30	.25
Silver King, Dak	1	Nov. 10	Dec. 10	Dec. 28	.00²½
Union Cons., Nev	36	Nov. 10	Dec. 15	Jan. 3	.50
Utah Cons., Nev	3	Dec. 13	Jan. 17	Feb. 3	.25
Vulcan, Dak	1	Dec. 14	Jan. 17	Feb. 17	.001

*The delinquent day and the day of sale were postponed to dates given above.

Boston Mining Stocks. Dec. 22.

[From our Special Correspondent.]

There has been a good degree of activity in mining stocks the past week, especially in copper stocks, but with one or two notable exceptions prices are lower than last week, owing in part to the difficulty of obtaining money on this class of securities, as well as the want of confidence of the general public in the permanency of the advance in ingot copper by the syndicate. The exceptions noted are the advance in Calumet & Hecla from $189½@$196 on more favorable reports from the mine, and the rise in Tamarack from $112@$125, caused by an increased demand for the stock from parties who are well posted in regard to the future of the mine.

Osceola has been very heavy and declined to $21, the first sale of the week being at $24, a net loss of $3. The reports from the mine are rather unfavorable and the decline is not unwarranted.

Franklin sold at $15¾ at the opening, declined to $15, and later sold at $13⅜; dividend $1 per share. It was, however, firmer to-day and advanced to $14, with last sale at $13⅞.

Quincy also lost a good portion of last week's rise and sold at $59, against $63; later it recovered to $60.

Atlantic has held steady at $13, with one sale, 50 shares, at $13¼.

Kearsarge declined to $5⅛, a loss of $⅝ from last week.

Huron sold at $5, and is considered a purchase at this figure with the present outlook of copper.

The speculative list has not been very active, but there is a quiet picking up of stocks, which later on will show a good profit to the purchasers over present prices. We note sales of National at $3@$3⅜; Allouez, $1⅜@$1⅛, with subsequent decline to $1½; Arnold, at 62½ cents; Star, at 65 cents; Washington, at 62½ cents; Ridge, at $1⅜@$1; Native, 40@30c.; Pontiac, at 45 cents.

Bonanza has quiet an active week and advanced from $1¼ to $1 11/16 with later sales at $1½. In the silver stocks Catalpa and Crescent have been in good demand; the former advanced from 26 to 35c. and the later to 20c. Dunkin dull at $1. There has been a demand for Breece on report that a dividend is likely to be forthcoming early in the new year. 32½c. was bid for the stock and none offered under 50c.

3 P. M.—The market was firmer this afternoon Franklin sold at $14@$14¼. Kearsarge at $5½, Osceola at, $21¼, and Tamarack steady at, $124; $50 was bid for Quincy and $190 for Calumet & Hecla, $196 asked.

FOR SALE, CHEAP—TWO PAIRS KROM'S New Swinging Block STEEL ROLLS, good as new.
THEODORE A. BLAKE, New Haven, Conn.

FOR SALE.—DIAMOND DRILL, BUILT by the American Rock-Boring Company, but little used, and good as new. Boring depth, 2000 feet. Machine is complete, with every attachment. For particulars address DIAMOND DRILL, P. O. Box 2345, New York City.

FOR SALE.
ONE RAND POWER COMPRESSOR.
12-inch by 36-inch stroke, with 2 balance wheels, 8 feet diameter, 12-inch face. Also 5 Rand Air Drills, 4 Tripods and 3 Columns. All in good order.
ILLINOIS ZINC COMPANY, Peru, Ill.

Geo. Wm. Ballou & Co.,
BANKERS.
5 Wall Street, New York.
TRANSFER-AGENTS FOR THE
SANTIAGO GOLD MINING CO.

☞ TAKE ADVANTAGE OF THE "BOOM," ☜
AND SEND FOR PRICES OF
Bartlett's Hot Blast Copper and Silver Lead Smelters.
Standard Water Jackets, built for BUSINESS under personal Superintendence of a Practical Smelter. Eastern Prices.
F. L. BARTLETT, Portland, Me.

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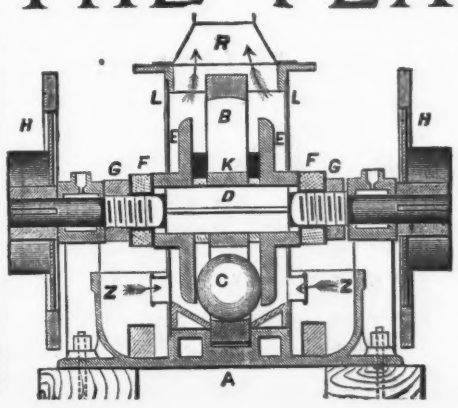

to any degree of fineness, from 20 mesh to an impalpable powder, either wet or dry, unsurpassed for quantity and quality of work. In constant use on emery for five years, and the only mill that has given satisfaction for that purpose.
NATIONAL PULVERIZER COMPANY,
PHILADELPHIA, PA.
ADDRESS
H. ALBRECHT,
Care of AMERICAN MACHINE CO., Philadelphia, Pa.

SPECIAL NOTICES.

313 WANTED—A FOREMAN FOR A foundry job shop. Address, giving particulars, references and salary expected, MOULDER,
Care of ENGINEERING AND MINING JOURNAL.

315 WANTED—A FOREMAN FOR COLlege shops to begin March 1st, 1888. Must be a young man, energetic, well posted, a first-class machinist and able to teach pattern making. $1000 salary for eight months' work. Address, giving references and particulars,
TEACHER,
CARE of ENGINEERING AND MINING JOURNAL.

316 WANTED—TWO GOOD MACHINISTS accustomed to sectional tap and die work, in a new pipe mill in the South. Men accustomed to tube works practice will have the preference. Address, with references and wages expected, ARRASTRA,
Care of ENGINEERING AND MINING JOURNAL.

317 WANTED—A THOROUGHLY PRACtical and experienced draughtsman and machinist, capable of taking charge of works (in Canada) building marine and stationary engines, railroad and general iron work. Address, with references,
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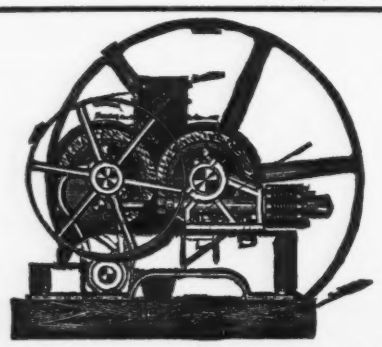

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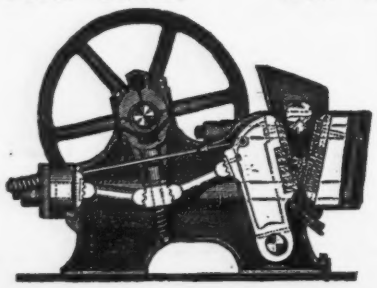

DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET,
NEW YORK, Dec. 13, 1887.

DIVIDEND NO. 56.

The Board of Trustees have declared a dividend of FORTY THOUSAND DOLLARS, the same being *forty cents* per share of the capital stock of the company, payable on the 5th day of January at the Company's offices in New York and San Francisco. W. VAN NORDEN, President.

OFFICE HOMESTAKE MINING COMPANY, MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Dec. 17, 1887.

DIVIDEND NO. 113.

The regular monthly dividend—TWENTY CENTS per share—has been declared for November, payable at the office of the Company, San Francisco, or at the Transfer-Agency in New York, on the 24th inst. Transfer-books close on the 20th inst. LOUNSBERY & CO.,
Transfer-Agents.

OFFICE OF THE ONTARIO SILVER MINING COMPANY, MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Dec. 20, 1887.

DIVIDEND NO. 139.

The regular monthly dividend of FIFTY CENTS per share has been declared for November, payable at the office of the Company, San Francisco, or at the Transfer-Agency in New York, on the 31st inst. Transfer-books close on the 24th inst.

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